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Bureau of Statistics and Economic Research, United Provinces

THE
FOODS OF A HINDU VILLAGE
OF
NORTH INDIA

BY
CHARLOTTE VIALI WISER, F. S. S., M.Sc.,

July, 1936

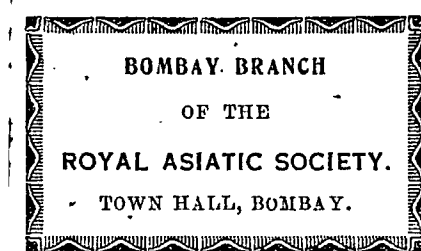


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1937



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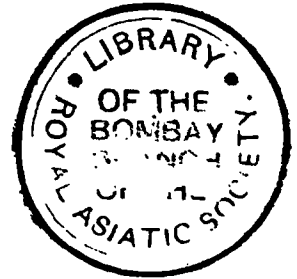
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I—INTRODUCTION

WE moved to the village of Karimpur in the autumn of 1925. My husband and I had found during our years in India that if we were to understand the people of the villages, we must not be content to visit them, but we must live among them. After a study of the villages in the district, we chose Karimpur for our village home. Uninvited, we moved our tents and belongings into a mango grove on the edge of the village. In our ignorance we thought that our village neighbours would be glad to see us. But they showed no inclination to welcome white strangers, and were decidedly aloof until we had proven ourselves harmless. When they did finally accept us, they took our residence among them seriously, and saw no reason why we should ever leave.

We thought, in the beginning, that a few months would give us what we ought to know of custom, activity, and thought. But when the hot season of 1926 arrived and we were obliged to retreat to a bungalow in the town of Mainpuri, five miles away, we had just begun to appreciate our ignorance. We commuted to the village from the town during the summer, and returned to live in it as soon as the heat was bearable in tents. We repeated this migration annually until the spring of 1931, when we left for America.

My intention was that I should act as the good will of the study. With one son five, and another not yet two, I felt that I had all that I could undertake. But the village women, confined to their courtyards, could not come to me. They kept calling me to them. And as I saw more of them and their share in family activities, I realized that to understand and interpret the life of the village, we must know more about the women. They are of much more importance, economically, than most students of Indian villages have given them credit for being. Observations in this field led me into further interest in their share in the care and preparation of foods.

Meanwhile, the increasing number of calls on us for medical help impressed on us the futility of trying to cure ills while the causes of those ills went unquestioned. This led me into a study of village food from the point of view of health. I knew very little about food. But I had to acknowledge that if I wanted to understand and help Indian village women I must learn more about

food, particularly their food. And out of this need grew the present study.

I learned all that I could about the foods procurable and the foods used, of food preparation and food customs. This material I carried to America, and with the help of specialists in the fields of nutrition and biological chemistry, I attempted to evaluate the foods eaten in our village, and to study the effect of customary methods of preparation on food values. The work was supervised by Miss Helen Monsch, head of the Department of Foods and Nutrition at Cornell University. Miss Monsch and other members of the staff, especially Miss Mary Henry and Miss Marion Pfund helped in the study of the chemistry of foods, and in securing standard tables of food values. Others who made the work possible were Dr. J. B. Sumner, Professor of Biological Chemistry, and Dr. L. A. Maynard and Dr. C. M. McCay, both of whom have much to bring to the field of human nutrition from their researches in animal nutrition.

I—A DESCRIPTION OF KARIMPUR AND ITS PEOPLE

Karimpur, the village of our study, is in the northern part of India, in the much fought over Ganges plain. This section of the country is known, under British rule, as the United Provinces of Agra and Oudh. The latitude of Karimpur is $27^{\circ} 9''$ North, about that of Palm Beach, Florida. The climate, however, is more continental than that of Palm Beach, and might better be compared with the same latitude in Mexico. The winters are delightful. In October, the heat relaxes, and the weather is progressively cooler until January when the mean temperature is 48.7° F. For us these are the months of refreshment. But for village families with lives regulated for hot seasons and no provision for cold, January and February are months of misery. In March the hot winds begin to blow, and from then until June the temperature rises steadily to a mean maximum of 112° F. The rainy season begins in July; over 60 per cent. of the annual rainfall comes in July and August. The temperature drops only slightly but the rain brings relief to men and fields. September, at the end of the rains, with its heat and humidity, unrelieved by rain, is the most trying month for all of us. It is made endurable by the thought that the siege of heat cannot last much longer.

Karimpur is in an area which has played an important part in the history of India. Not far away are Kanauj, capital of the Harsha dynasty (A.D. 604), and Kampiyala, the stronghold of the Panchalas, heroes of the Indian epic, Mahabharata (before 400 B.C.). Sixty-five miles to the south-west is Agra, with its Taj Mahal, and great fort of the Moghuls.

Agra is the nearest city. Cawnpore, next nearest, is 110 miles south. As yet, neither city has made its influence felt in Karimpur. There are two market towns which link the village with the outside world. One is Kuraoli, $7\frac{1}{2}$ miles to the north, with a population of 4,717. The other is Mainpuri, $5\frac{1}{2}$ miles south. The population of Mainpuri is 15,599. Farmers of Karimpur take their surplus produce to either of these market towns to sell, and while on such an expedition, they may stop to buy clothing or food not available in the village. But they fear the clever merchants of the town, and avoid dealing with them as far as possible. They prefer to confine their activities to the village, with the minimum of outside contacts. Mainpuri is the official headquarters of the district. This necessitates trips to the Mainpuri courts to settle major disputes, chiefly those over land. But such trips are costly and confusing to farmers. And they prefer, if possible, to settle their disagreements at home with the advice of their own village council.

This aloofness has protected the Hindu culture of Karimpur from inroads of changing dynasties—an important reason why it is a good field for our study of Hindu foods. It shares this advantage with other villages of the district. But it has additional points in its favour. Mainpuri District covers 1,675 square miles and includes 1,388 inhabited towns and villages. Two hundred and five of these have a population of over 1,000, and are too large to be representative. Of the 1,183 under 1,000, many are very small and confined to few castes, and often to only one or two industries. Karimpur, with its population of 754, presents a variety of castes (seventeen), as well as two groups or castes of outcastes, four groups of Muhammadans, and several families of Christians. It is dominated by Brahmans, which strengthens its barriers against foreign ideas. Like most of North India, farming is its outstanding occupation, with the subsidiary industries needed in a self-supporting community.

The dusty, mango-shaded highway from Mainpuri to Karimpur, winds northward through a patchwork of small, oddly shaped farm plots separated from one another by low mounds of earth or narrow irrigation ditches. Sometimes there is an open stretch of uncultivated land which is too alkaline for crops, but which puts forth a stubby growth sufficient for meagre grazing. The animals must keep moving and searching if they are to keep alive. One is impressed by the leanness of the cows, and the thinness of the small boys who herd them. There are no houses on the farm plots. But there are hamlets, not much more than a mile apart, where the houses of farmers are huddled together. They are at a distance from the highway and easily passed unnoticed, with their monotonous gray walls.

If one were to follow this highway a few miles further north, he would come to the old Grand Trunk Road travelled by Kipling's Kim. Five and a half miles out from Mainpuri is the village of Karimpur. There are two small sections of the village directly on the highway, while the village proper stands back 200 yards to the east.

The first of the roadside sections is Chamar Nagariya, home of leather-workers. The leather-workers are counted as outcastes, but not as untouchables. All of the leather-workers' families save one, live in this section. It consists of just two enclosures side by side, with a high mud wall extending across the front of both of them. Along two sides of each enclosure are small rooms, one room to a family. The men who live here wear scant loin wrappings, and no shirt except in cold weather. They are dark skinned. Their legs are long and spindling, and their knees and ankles bulge conspicuously. Their ribs and shoulder blades stand out, and their arms seem disproportionately long, like their legs. Their faces are deeply lined. Their teeth are ground down, and dark. The women's bodies are covered by long skirts, badly torn, but still so full that they are a protection. Over their heads they wear stained, grayish scarves, and some have short vests. One or two have smoother lines than

the men, but the others have the same long thin arms and hard, bony hands. The boys and girls are dressed like their elders, and look like them except for their fuller faces, fewer wrinkles and better teeth. The babies are plump and laughing. They go unclad when it is warm, and wear short vests when it is cold.

The other section by the roadside is Kachhi ka Nagla, hamlet of vegetable growers. They are true farmers by right of caste, along with the family of rice-growers which lives in the section with them. Although poor and in debt to Brahmans, they are independent, which may account for their living apart from the rest of the village. Among them we have the nearest approach to the joint-family that we find in the village. High mud walls enclose each joint-family, with its animals, its implements and its stores of grain—all of its possessions except land. The men, dressed in loin cloths, are short and slight but not as gaunt as the leather-workers. Their dark skin fits more smoothly over bone and muscle. One of their elders might be mistaken for Gandhi, especially since a cataract operation has made it necessary for him to wear spectacles. The women are small and thin, and their babies are plump and placid. The older children are copies of their parents.

As one turns east and bumps over the remnants of irrigation ditches which cut across the dirt road, to the village proper, he sees a long line of almost unbroken mud walls. He can guess where one man's wall ends and his neighbour's begins, only by the differences in height and smoothness of different portions of the wall. At the north end and at the south of this long wall there is a cluster of small, low-walled enclosures, each cut off from contact with the main wall by a lane. These are occupied by two castes of outcastes. Those living on the southern end are mat-makers, who make their living as farmhands. Their wives serve as midwives. The men are small and most of them are as thin as the leather-workers. But the arms and shoulders of the young women curve smoothly. And their skirts do not hang from protruding hip bones, like the leather-worker women, but from plump hips and abdomens. The outcastes at the northern end are the village scavengers, and therefore untouchables. They have recently been baptized as Christians, but are still regarded as untouchables by the villagers. Here too, the men are thin, with three exceptions. The younger women are attractively smooth-skinned, while the middle-aged and older women look tired, and their dark skin is drawn tightly over broad cheek bones, and hangs loose and dry between sharp elbow and wrist. In this group of untouchables one finds the darkest skins, the flattest noses, and the broadest faces in the village—evidences of Dravidian heritage.

Between the two outcaste communities there extends the long line of walls of caste enclosures. And beyond these enclosures are more like them, with the same high walls and small doorways. As far as possible they are built side to side and back to back, the only break

being an occasional narrow lane or footpath leading to enclosures deeper in the village. If one is a stranger, he may follow any of the footpaths through the village and see only high gray barriers and blank doorways leading to stables. The stable is the entry-way to every enclosure. But if he is a friend, he sees the family enclosures overflowing into the paths. Children, puppies and goats tumble under his feet. Carpenters and potters carry on their work in the lanes before their doorways. And serving women salam him as they pass by with head scarves drawn down over their faces. No matter how good a friend he may be, he never enters an enclosure other than his own. If it is necessary for a carpenter to repair a door frame or a beam, a man of the house accompanies him inside and remains until the work is finished. Women of serving castes are obliged to leave their own homes to work, but those of higher castes are jealously hidden within high-walled courtyards behind high-walled stables.

The families of each caste live close together, preferably in adjoining enclosures. The Brahmans (188) occupy the whole eastern section of the village. They are of priest-class by birth, but in practice they are farmers. Below them in the caste scale, in the order of their rank, are : bards (15), accountants (6), goldsmiths (10), flower growers (17), vegetable growers (152), rice growers (6), carpenters (42), barbers (2), water bearers (83), shepherds (26), grain parchers (10), seamsters (21), potters (9), tradesmen (14), oil pressers (10). In addition there are the outcastes—washermen (6), mat-makers (28), and leather-workers (29). There are also the Christian sweepers (35); and four groups of Muhammadans—faqirs or beggars (23), bangle sellers (10), cotton carders (9) and dancing girls (3). The numbers given include all members of each caste, not just the members who are actually engaged in the caste industry. All of these, caste and outcaste, serve the Brahman farmers, and at the same time are able to exchange services with each other.

It is comparatively easy to recognize a Brahman. Even the older men among them who are bowed and withered, retain the bearing and features which mark them as Brahmans. There are exceptions, but one is fairly safe in picking the tallest, straightest, most firm-limbed young men as Brahmans. Their skin is fairer and their features finer than those of lower castes. Their noses are high and narrow. The Brahman women, always kept safely in the courtyards of their family enclosures, work as hard as other women. But they too have the fair skin, the narrow noses and faces, the firm, smooth bodies which set them apart from others of the village. None of them is fat. We have known only one fat person in the village, a woman of carpenter caste. Her fat was diagnosed as a symptom of her diseased condition. Brahman babies seem no plumper than others, and when weaned, they pass through the same period of loss in weight and resistance as do low caste babies. But if they survive this precarious stage, they surpass other children in weight, height, and strength.

Smallpox scars and inflamed eyes are less common among Brahmans than among other castes.

Passing down from the Brahmans, the next three castes compare with them favourably. The goldsmith brothers are the village wrestlers, and are fed and massaged with this in view. Below them there is a decline in the evidences of well-being. From appearances it would be impossible to ascertain to what caste a man, woman or child of the humbler levels belongs. Sometimes an individual family gives its children a little better care than others, but such families are not confined to any one caste. A few Muhammadans may be recognized because of their more hawk-like noses. And the Christians are set apart by the consciousness of their untouchability and their broader Dravidian features. Aside from these differences, all are very much alike. One becomes so accustomed to signs of insufficient food and care that his attitude toward standards of living is apt to shift.

Most of the men and women of the lower castes are angular, with hollows where flesh should be smooth. Bodies go unbathed, in contrast to higher castes where pour-over baths are supposed to be a part of the day's routine. They sleep and work in the same garments, and change them once in two or three weeks, whenever the washerman collects them to wash in the village pond. He uses cold water, beats the clothes on a rock, and spreads them on the dusty ground to dry. After a few washings a garment takes on the shade of gray of the earth and mud walls. The men's hair is cut short, with one long lock at the top. The women and girls do not use combs, and their hair tangles and mats, and offers refuge to multitudes of lice. Smallpox scars and eye infections or disfigurement are so common as to excite no comment. Both men and women work to the limit of their strength, and are thankful if they can earn enough food to make it possible for them to perform the tasks required of them. They do not hope for more, except on festival days when Brahman housewives hand out bread or cakes to the women and children of families performing regular services for them. The boys who run about the village lanes, or herd cows or sheep are small, lithe, and active, ready for any sort of fun. The little girls are the same. But before they are ten, they retire demurely to the courtyards where they care for their baby brothers or cousins, and imitate their mothers. The life cycle of the women is briefer than ours. The girls mature earlier—at ten or eleven—, are married at twelve or thirteen, and go to live in their husband's homes when fourteen or fifteen. From this time on, they are treated as grown women, capable of carrying a full share of the heavy work of farm households. They begin bearing children in the next two or three years, and although they do not have many babies, there is a constant sex-strain on their bodies. All of their work is done sitting or squatting on the ground, which is less wearying than standing. In spite of this, almost every mature woman of the village complains of the dragging down of her body.

While we, in our early thirties, are facing the choice between a career and rearing a family, they are ready to sit back and tell their daughters-in-law how to feed their babies. The Indian Year Book for 1931 gives the mean age of males as 24·8 and of females as 24·7, according to the 1921 census.

II—FOOD SOURCES

The families of Karimpur retain their customary aloofness in meeting the problem of food supply. They prefer to accept the limitations of their own immediate environment, rather than venture into strange markets. Salt and spices are brought in from the outside, and sold by the small tradesmen. And an occasional purchase is made on a grain selling trip, or on a visit to a religious fair. These purchases are confined to familiar products which are considered a treat because of their limited season or supply within the village. Unfamiliar products have no charm. About 40 miles from us is a district reputed for its oranges. These oranges are sold cheaply in the Mainpuri market during two winter months. But they are not brought home to the village. On the other hand, bananas are familiar, because a few are grown in the village. And bananas are brought from Mainpuri, when the price is sufficiently low. Each year tomatoes are sold in increasing quantities in the Mainpuri bazaar, but in the village the tomato is still a strange fruit, of an undesirable colour, and the villagers regard it with suspicion. Their diet is thus largely determined by the boundaries of their own fields. And it rises and falls with good and lean years. If the rains are favourable, and there have been no hail storms or destructive winds or pests, everyone has enough to eat. The villagers have learned to count on one or two such years out of every five. If the rains fail, or come too late, the whole village cuts rations. If one particular crop is damaged, they get along without it until it is harvested the following year.

Their exclusiveness does not limit their diet as much as one might expect. There may not be a variation in foods in one single day or in a week. But over a period of months there is considerable variety. The villager accepts his changes in food with the changing seasons. He is thus better prepared to welcome each new crop as it comes than is the town man who has greater variety each day. Still further, although the town man seems to have a greater choice of foods in the bazaar than the villager has in his fields, the villager has discovered many edible things which vary his diet and which rarely find their way to the town.

A—VARIETY OF FOODS MADE POSSIBLE BY CLIMATE AND SOIL

One reason why a greater variety of foods can be produced from a limited area, in the United Provinces than in Bengal and further south, is the greater distinction between the seasons. We have our hot dry summers when land rests, followed by warm rains which make crops of warm climates, like rice and sugarcane, possible. The rains are followed by a long dry season, a part of which is much cooler than Bengal, and which permits the growing of cold weather crops, such as wheat. One can better appreciate the variety of foods in Karimpur by comparing them with the diet of less favoured districts. In his

study of the use of food-grains in India, Church (1) found that "There are many districts in India where rice forms not merely the chief food-stuff but three-fourths or even four-fifths of its total amount. In some places it even rises to seven-eighths or to fifteen-sixteenths of the whole quantity, as in Burdwan, Dinajpur, Maldah, Kuch Behar, Manbhum, and Darrang; other districts might be named in which it constitutes the only food staple."

Another factor which contributes to the variety of the foods of our village is the variety of soils. The soils of Karimpur are typical of those of village communities of the Ganges plain. The following division of the revenue village is given in the latest Settlement report. These reports are made every twenty or thirty years by government settlement officers.

Revenue village of Karimpur

	Acres
Village sites	35
Covered with water	202
Otherwise barren	1,609
Culturable land	2,103
Miscellaneous land	144
	4,093

The 2,103 culturable acres are distributed as follows :

Type of land	Acres
Gauhan	39
Manjha wet	204
Manjha dry	18
Barha Dumat wet	554
Barha Dumat dry	242
Barha Bhur wet	518
Barha Bhur dry	160
Maiyar	68
Tarai	300
	2,103

"Gauhan" is the land immediately encircling the village. It is the best manured, and is rented at the highest rate. It may be any kind of soil, usually a loam, improved by constant manuring. Farmers prefer to grow maize, sugarcane, peas and potatoes on this soil, or on the next grade, which is listed as wet and dry "Manjha." "Manjha" is the same type of land as "gauhan," but it is the strip just outside the "gauhan," and therefore less manured and less desirable. Most of the vegetables are grown on one of these two soils, partly because of the improvement of the soil, and partly because vegetables require constant care and constant watering except during the rainy season. The outlying land is known as "barha." "Barha dumat" is a mixture of clay and sand in almost equal proportions. It is "generally of a rich brownish colour, adhesive without tenacity, friable without looseness, slippery and greasy when wet and with a soapy feeling when dry, and cutting like a cheese when ploughed wet."

(1) See References, page 121

"Barha bhur" is outlying land which is "loose and sandy, and quite incapable of retaining moisture." (2)

The "dumat" will bear a large variety of crops, including wheat, barley, several varieties of millet, and pulses. Whereas the "bhur" is so sandy that crops which survive with the least irrigation are reserved for it. It is usually limited to spiked millet and coarse pulses. "Tarai" is the low lying land, which "includes all classes of natural soils from very heavy clays to loose sand." (3) In our area it is chiefly heavy clay.

On the "tarai," rice is usually grown, and sometimes water melons. In ordinary years it is swamped during the rainy season. "Maiyar" is "a stiff, unyielding clay of a dark colour, shrinking and cracking in dry weather into a network of fissures, but expanding when moistened into a sticky clayey mass." (4). It can be made to produce some of the less desirable pulses, and millets, and perhaps rice.

Each farmer wants a share of the better land, and not too much of the poorer land. This has led to the partitioning of land into small, queerly shaped plots. A man may have as many as sixty or seventy plots scattered over the different kinds of soil in every direction from the village. R. Mukerjee writes of these scattered plots, "Various are the causes which tend to render a peasant's fields so widely scattered. In the village communities there was a deliberate attempt to distribute plots among the settlers in different soil areas so as to allot plots of different degrees of fertility to each . . . The Indian cultivator's farm tends to fly into fragments and grows steadily smaller and less regular. As the population increases, the holdings on account of the law of succession come to be unduly fragmented." And further on he refers to "the pepper pot distribution of holdings." (5)

The following table shows the proportions of each type of land included in the scattered plots of J, one of the largest land-holders of the village, and compares the proportions of his holdings with those of the same kinds of land of the whole village :

Percentage of each kind of land in Karimpur compared with percentage of same kind of land held by J, a Brahman

Kind of soil	Percentage in revenue village	Percentage in J's hereditary holding	Percentage in J's total holding
Gauhan	1.9	1.2	0.9
Manjha	10.6	15.3	15.1
Barha Dumat	37.8	47.9	46.2
Barha Bhur	32.2	22.3	21.0
Tarai	14.3	13.3	16.8
Maiyar	3.2	..	..
	100.0	100.0	100.0

"The hereditary holdings show the closest correlation because they conform more closely to the original division of land." (6)

With such an arrangement, each long-established family has a chance to raise a variety of crops, even though its acres are few. Poorer farmers, and those whose forefathers came in after the original division was made, may have little or none of the best land, and a larger share of undesirable land. But even they manage to get a variety of crops, by hard work and a resigned acceptance of inferior products as part of their inferior lot.

W. H. Moreland of the Civil Service discusses the management of farm land composed of scattered holdings, in his *Agriculture of the United Provinces* :

"Now, considering the variety of soils and of possible crops, this looks like a very complicated problem, and it is fortunate that the individual cultivator has not to face it without some guidance. The question has been attacked by many generations of cultivators and their accumulated experience is to be found in the *custom of the country* which guides the individual on such questions as what crops can be safely grown on hot soils, what crops will repay irrigation, what is the best means of distributing manure over the holding, in what order should crops be grown, and so on. This custom of the country is not an infallible guide to the most profitable utilization of the holding; the best course may never have been tried or may have been discarded through some mischance, or changes in the level of prices or in the demand for particular products may make some changes in the custom desirable; but it is usually a safe guide to making a living, and the ordinary cultivator is well advised in following it rather than applying his limited intellect to working out a solution afresh."

And further on, he describes the arrangement of crops as actually practised :

"To see how this custom works out in practice, we may take the case of a holding of the ordinary size, say 5 or 6 acres, containing different soils. There may be a field of high sandy land; it cannot be irrigated and it dries so quickly that it would be very risky to sow winter crops on it: this land will usually have a rainy season crop. But even in the rains it is not very productive, for it will suffer from either wet or drought: not very much will be spent on its tillage, and it will usually be sown with cheap crops such as bajra (small millet) and moth (a pulse) which do fairly well on such land at a small expenditure. There may be another field of heavy clay; this will be regularly sown in the rains with rice, the only crop for which it is really fitted, while if possible some cheap pulse will be sown with rough tillage after the rice has been gathered. The rest of the holding consists,

we will suppose, of irrigable loan. One portion of it, however, is so low lying that it is always more or less flooded in the rains: this portion will probably be sown regularly with a winter crop, which may sometimes be wheat and sometimes a mixture of wheat or barley with gram or peas. The rest of the land is suitable for either season and will be divided between the two in such a way that tillage can be effected in the time available. Possibly the cultivator will do this in the following way: taking the field nearest his house he will apply his manure to it and sow maize, which will be followed by some winter crop: another field he will put under great millet, arhar and urd (two pulses), with some sesamum to supply his house with oil, and a border of hemp to give fibre for well-ropes, etc.: the remaining land will be left for the winter and after manuring, sown with wheat along with a border of linseed or some lines of rapeseed, to supply more oil. In this way the cultivator would get an early supply of food from his maize, say about the end of August or September: rice in September or October: juar, bajra, urd and moth (two millets and two pulses) in November: pigeon peas and whatever cheap winter crops he had sown in March and April, when he would also have his wheat ready to sell for the rent.

"This is the holding of a cultivator of no special skill: a better man would get in a field of sugarcane or opium, or would manage to save more manure and take two crops in a year off a larger area, but the general principles will be the same: to secure sufficient food, with preferably an early supply in the rains; to have something to sell; to have a good variety of crops; and to arrange so that there may be time to till for all with the single pair of cattle which is all that a holding of this size can support." (7)

B—THE CROPS

One of the farming customs of the Ganges plain is the mixing of crops. Products intended for sale are kept unmixed. At least the farmer tries to keep them unmixed. But he is so accustomed to mixtures, that if barley or pigeon peas get into the wheat he sees nothing objectionable in the mixture. It is when his product reaches the city market, particularly where foreigners buy, that he is accused of adulteration. In his study of "Food-Grains of India," Church remarks, "The value of Indian wheats in European markets is often much lowered by preventable impurities. Very frequently they contain other cereal grains, especially barley; gram and linseed some times occur in them." (8) And McCay in his study of jail dietaries in the United Provinces, writes, "The chemical analyses of wheat in use in the different jails show greater variation than any other of the food materials. This is practically entirely due to the different degrees of contamination with other grains, most of the samples in ordinary

(7), (8) See References, page 121

use were of second class quality and contained a large proportion of foreign grains.”(9)

Wheat grown for home use is almost always mixed with the poorer quality cereals. Its presence makes bread made of barley or millet more palatable. And as long as the grains will be cooked together, they may as well be grown together. The more common mixtures have names, according to the grains they contain, and the proportions of each. “Gojai” is a mixture of wheat and barley. “Tirra” is wheat, barley and gram in equal parts. “Bejhar” may be equal parts of barley and peas, or equal parts of barley, gram and peas. Within the village, the selling or loaning of mixed grains can be carried on satisfactorily with the help of these names.

There are several advantages to the Karimpur farmer in raising mixed crops. A mixed crop may serve as insurance. A crop, such as rice, which flourishes in heavy rains, may be planted with a coarse millet, which flourishes in dry weather. Then, if the ground is flooded there will be rice, and if there is very little rain the rice may be lost, but there will be a millet crop. Sometimes two crops are grown together to save land. Millet and the pigeon pea are such a combination. The millet grows up more rapidly and the pigeon pea grows more slowly, until the millet is cut. As soon as the millet is cut the pigeon pea grows more rapidly, and when harvested yields about two-thirds of what it would without the millet. And the farmer is one millet crop ahead. In some cases a creeping pulse is grown with taller crops, to retain as much of the moisture in the ground as possible. Or a deep-rooted plant may be grown with one with shallow spreading roots. The most common crop mixture is that of, at least one pulse with a cereal. The farmer does not know about nitrogen but he and his forefathers have found that the soil is benefited by the presence of a pulse. They have also discovered that pulse alone is not a satisfactory food. The mixture of pulse and cereal is the happy solution in the field and on the brass eating tray. The following record of his own crops, given us by a village cultivator, reveals the extent of crop mixing, particularly with food crops :

(9) See Reference, page 121

Crops grown by a Karimpur farmer

Crop	Grown with		Reason for mixing
Wheat	1. Barley, or ..	2. Barley and gram ..	1. Mixed food. 2. Mixed food.
Barley	1. Gram, or	2. Wheat	1. Good for soil, and 2. Mixed food.
Field peas	Alone, or with wheat ..		Mixed food, and good for soil.
Sarson (mustard) ..	1. Wheat, or ..	2. Barley	Both save ground.
Gram	1. Wheat	2. Wheat and barley.	Both for mixed food.
Duan (mustard) ..	1. Wheat, or ..	2. Barley.	Both save ground.
Potatoes	Alone.		
Sugarcane	1. Hemp, or	2. Castor plant on border.	Both, 1 and 2, save ground.
Water melons	Alone.		
Little millet	Cotton		Saves ground.
Great millet	1. Pigeon pea, mung, or urd	2. Mustard	1. Mixed food. 2. Saves ground.
Spiked millet	1. Moth (pulse) or pigeon pea.	2. Mustard	1. Mixed food. 2. Saves ground.
Maize	Alone.		
Rice	Alone.		
Pigeon pea	1. Millet	2. Cotton	1. Mixed food. 2. Saves ground.
Urd (pulse)	1. Millet	2. Cotton	1. Mixed food. 2. Saves ground.
Mung (pulse)	Millet		Mixed food.
Moth (pulse)	Spiked millet		Mixed food.
Ronsa (pulse)	1. Great millet ..	2. Spiked millet.	Both, mixed food.
Cluster bean	1. Great millet ..	2. Spiked millet.	Both, mixed food.
Sesamum	Cotton		Saves ground.

The grain crops of the village are familiar to us of the West except in the use for which some of them are intended. We in the United States regard certain millets, such as *sorghum vulgare*, as fodder crops, but in Karimpur they are grown as a complete family food—first for the human members of the family, and secondly for the animal members. Moreland, in his *Agriculture of the United Provinces*, remarks: "in many parts the cultivator cannot spare any part of his land solely for fodder crops, but must grow crops which will feed himself and his family as well as his cattle."

To a Westerner, the pulses are less familiar than the cereals. The "arhar," or pigeon pea, is the most common. Its yellow flowers colour the village fields during the cold season. It is one of the hardiest of the field crops. The peas, dried and split, are used by everyone. "Urd" and "mung" are much alike and are usually classed together. They are the best liked of all the pulses. "Moth" is the least used. Some do not care for it, while others keep a small store of it on hand as a special food for invalids. These three, "urd," "mung" and "moth," are dried and split, like the pigeon pea. Bengal gram is one of the most welcome of the products of the spring harvest. In the fields, around the home fire-place, and at the grain-parchers, it supersedes all other parchable foods. Travellers carry it parched, often their sole food. In the Indian army it has been adopted as emergency rations. A few pulses, like the field pea and the cluster bean, can be used green for a short period. But as soon as the peas are ripe they are treated like the other pulses—split and dried. When split, this whole group of pulses is known as "dal," an important division of any family's diet.

Vegetable crops are traditionally in the hands of vegetable growers, Kachhis. The task of growing them is not so much an exclusive privilege as a laborious caste duty. We have been interested in the slight increase in vegetables grown by ordinary farmers during our years in the village. They have discovered that enough water spills over the edge of the big leather water bags to keep vegetables alive on a small patch of ground surrounding an irrigation well. Beyond this they have neither the patience nor the interest to struggle with vegetables, especially in the hot weather when it seems as though nothing green can possibly survive. They leave vegetable growing to the Kachhis. The vine crop is the largest vegetable crop in the village. It includes several kinds of cucumbers and melons which were new to us. Like other foreigners in India, we found the hot season made almost unbearable by the absence of fresh vegetables, until our Indian friends introduced us to several unattractive forms of cucumber, melon and gourd, and showed us how appetizing they could be made with the help of green mangoes and spices.

Tubers and roots are depended upon for winter vegetables. Potatoes are dug and used when very small, chiefly because the crop is in danger of being stolen, or of being destroyed by porcupines.

Radishes and carrots, on the other hand, are allowed to grow very large. In his *Agriculture of the United Provinces* (p. 222), W. H. Moreland reports "Radishes are grown for their bulk, and may be anything up to a foot in length." Of carrots he writes, "The Indian carrot is different from that which is familiar to Europeans as a vegetable; the root is dark coloured and is coarse and flavourless." Beets and tomatoes are grown on a small scale in the vicinity of Mainpuri, but Karimpur conservatism bars them from its fields. The prejudice is chiefly against their colour which is that of blood. Onions are limited in their growing and use to the lower castes. In the *Laws of Manu*, V. 19, it is written "A twice-born man who knowingly eats mushrooms, a village pig, garlic, a village cock, onions or leeks, will become an outcaste."

There appear, in the village list of vegetables, foods which we overlook. Buds of certain trees are treated as vegetables. And a whole series of leaves, some wild and others incidental to the growing of some field crop, are utilized. Among the former is the white goose foot, and among the latter are radish tops, the leaves of the Egyptian arum, and the tender tips of pulse and mustard plants. All of these leafy foods are set apart from other vegetable foods, and cooked in a special way. In the village they are called "sag," or greens.

The village looks to its trees as a special source of variety in the diet. And the trees have something to offer during most of the year. Some of the fruits, like the neem and peepal berries, we would never consider as human food, and in government publications they are listed as famine foods. But the children eat them in large quantities and farmers munch them on their way to or from the fields. The children also gather and eat the blossoms of the mahwa tree, and forage for wild plums. Their enjoyment of plums, as well as of other fruits, when hard and green, is amazing. Anyone who has tried to eat a tamarind pod knows how painfully sour it is. We use it to make a hot season drink. But the village youngsters chew one after another without a blink. The tamarind is valued in Sanskrit medicine for its antiscorbutic effect. Certain fruits are so rare that only a few can have them, even for a limited season. Among these are the pomegranate, custard apple, guava, date and lime. Bananas are somewhat less rare, but are treated as a luxury. They are sliced green, skin and all, and cooked with vegetables. Musk-melons and water-melons appear when most welcome, in the hot, dry weather. Everyone manages to get a share of both.

The most popular and the most abundant of all the fruits is the mango. In the hot months, when the ground is baked hard and few growing things survive, the mango trees yield their crop. Mangoes seldom ripen. Wind storms bring down some of the fruit. And the rest comes down, with the help of sticks and stones and secret trips up the trees, before we think it ready to eat. It is the right of everyone in the village to have a share of the mangoes. This is in accord

with the Laws of Manu (VIII, 339). "The taking of roots and of fruit from trees. . . .Manu has declared (to be) no theft." The owners of groves do not object to the stripping of their trees, as long as the trees are not damaged, and as long as the fruit is reasonably distributed within the village without being sold. If mangoes were picked and sold, even by the owner of a grove, the village would deal with the offender by its own unique method, that of non-co-operation. We have known progressive landlords who have raised mangoes for sale, but they have been powerful enough to assert their rights. In our village, the old custom prevails to the extent that owners of groves entertain no thought of financial profit. One man, of farmer caste, owns an unfenced grove of 25 old trees, bearing in a good season over 50,000 mangoes. Our office clerk lived in the home of this farmer, and was in a position to observe closely. No mangoes were brought into the owner's house from his own grove, during the clerk's two years' stay with him. Fruit from nearby trees, belonging to others, met the needs of his family. He was following the practice of his forefathers in letting others enjoy the fruit from his trees. And he is assured that as they were blessed by the religious merit thus acquired, so will he be blessed, especially since a number of those who eat his mangoes are twice-born. The Government encourages the preservation of groves by not taxing them as long as they remain groves. Rule 4, Chapter I of the Wajib-ul-arz (Customary Law) states that, "If the trees of a garden are cut down and new trees are not replaced, the Government will have a right to assess land revenue according to circle rates, if that grove has been exempted from the assessment of land revenue at the time of the current settlement." This has helped retain the groves which existed before the last settlement. But there has been almost no effort to plant new groves. The custom of free distribution of fruit fitted into the old regime of simple, personal exchange. Under the comparatively recent system of money exchange, men want some assurance of a money return, before taking the trouble to plant and foster young trees. The following table gives a picture of the sources of the village supply of cultivated fruits.

Number and kinds of trees found in groves of Karimpur

Name of tree				Number mature trees	Number immature
Mango	..	..	..	159	187
Tamarind	..	..	..	1	4
Neem	..	..	..	219	1,051
Peepul	..	..	..	12	8
Gular (wild fig)	..	..	..	5	37
Bel	..	..	..	36	66
Wood-apple	..	..	..	5	27
Indan jujube	..	..	..	46	132
Jaman (kind of plum)	..	..	..	45	63
Khajur (kind of date) . .	..	..	..	9	76

Name of tree			Number mature trees	Number immature
Khata labhera (plum)	..	..	24	55
Heens	..	..	..	17
Jack fruit	..	..	..	9
Chuara (kind of date)	..	..	..	9
Pomegranate	..	..	5	2
Guava	..	..	50	25
Plantain	..	..	18	..
Lime	..	..	3	5
Mahua	..	..	12	3
Rai labhera (kind of plum)	..	..	..	1
Banyan	..	..	1	2

Number and kind of trees on the village site

Name of tree						Number
Mango	..	..	..	..	..	1
Tamarind	..	..	..	..	..	10
Peepul	..	..	..	..	..	3
Ber (Indian jujube)	..	..	..	..	..	8
Jaman	..	..	..	..	..	3
Khata labhera (plum)	..	..	..	..	..	2
Anar (pomegranate)	..	..	..	..	..	1
Amrud (guava)	..	..	..	..	..	2
Banyan	..	..	..	..	..	3
Bel	..	..	..	..	..	1

The ponds near the village contribute a share of the food supply. Vegetable growers and water-bearens collect generous quantities of water chestnuts and seeds of phapola, a water vine, from nearby ponds, and sell or exchange them at such a low rate that everyone can buy. The phapola, puffed, or popped, was one of our happiest discoveries among village foods. We like it better than popped corn.

At the festival known as Deotan, in November, everyone in the village is allowed a taste of sugarcane, even though it is not ready for cutting. From this time on, one meets children and men chewing and sucking stalks of cane. A stalk may be broken off as one passes by a field, without offence. Not much fresh cane reaches the women shut in the courtyards. But they enjoy whatever the children remember to bring home to them. The fresh juice adds variety to a number of dishes during the pressing season. And the raw sugar, made by boiling down the juice and pressing it down into large cakes, supplies the village with sweetening for the year.

C—ANIMAL PRODUCTS

Animals are a minor source of food supply in a vegetarian community like Karimpur. Cows are kept and milked, but the milk is seldom used as such. Boiled, churned into butter, and clarified, it supplies the pure fat for deep fried foods. Beef is never eaten. Goat meat is eaten about twice a month by the goldsmiths. And Muham-madans eat it oftener, if they can afford it. The goats kept by the village goatherds are supposedly kept for milk, which is sold in Mainpuri. But occasionally a goat, no longer useful, is sold quietly

to a Muhammadan butcher. Any goat meat beyond this comes from Muhammadan communities outside Karimpur.

Fish is not eaten by members of the higher castes. But members of lower castes have a feast of fish, during the few days before the ponds dry up for the hot season. The men who are draining the pond with their reed water-lifting baskets, let it be known when the water is getting too low for further usefulness for irrigation. The word passes swiftly, and on the following morning a crowd of low caste men and children-gathers at the edge of the pond. Each one has a big round basket without a bottom. The instant the irrigators announce that they are through, the fishers wade into the shallow water and push their baskets down into the mud bottom. They scoop out any fish they have thus captured, and move forward a few steps where they try again. The fish are small, but they are an annual treat.

The few chickens in the village belong to the sweepers, lowest of the outcastes. No one else would eat their eggs or their flesh. The sweepers, along with the Dhanuks, another group of outcastes, own the swine, which act as village sewage system, and which are the only animals raised with a view to butchering. There are many foods denied these outcaste families, but when a swine grows old or ill and is butchered, the feast is theirs. No caste person would come near enough to interfere.

If a family is small, and can afford to keep a buffalo, there will be "ghi" or clarified butter, for all of the cooking. But in most families the "ghi"* must be supplemented by mustard oil, or sesamum oil. There are several varieties of mustard and rape grown in the fields of Karimpur, usually mixed with grain crops, but harvested separately. Each farmer tries to have his own supply, which he stores, and has pressed month by month, by the oil presser. The better grades are very satisfactory for deep-fat frying. The poorer grades are bitter. The women who are obliged to use the poorer oil, try to relieve it by adding some of the better. When mustard oil becomes scarce, the sesamum harvest is ready with its fresh oil supply. The sesamum is valued not only for its oil but for its flavour. The seeds, with crude sugar, are made into balls. These are among the most popular sweets in the autumn.

D—SPICES

If one tries eating Indian vegetables with only salt added, and then visits an Indian home where these same vegetables are prepared with spices, he has a new appreciation of the art of spicing. An untempting vegetable can be spiced and cooked in several ways, and scarcely be recognized as coming from the same plant. This ability to use spices properly is even more important where there is no meat or meat stock to supply flavour. The variety of spices used in a village home is limited by purchasing power. Everyone tries to have at least red and black

*Pronounced " ghee ".

pepper, coriander, asafoetida, and turmeric, along with salt. Other spices are necessary for certain dishes, but may be omitted from ordinary daily cooking. A list of spices sold by a village tradesman follows. Two other tradesmen have smaller stocks of the same things. The list does not include peppermint, which is grown in some of the larger courtyards, or coriander, which is grown in fields with grain crops.

Condiments sold by Mohan Singh, Karimpur

Local name	English name	Botanical name
Hing	Asafoetida	Ferula alliacea.
Lal mirch	Red pepper	Capsicum frutescens used both green and ripe.
Kali mirch	Black pepper	Piper nigrum. From unsorted berries, with some husks.
Safed mirch	White pepper	Piper nigrum. From sorted berries.
Saunf	Aniseed	Pimpinella anisum.
Kala jira	Small fennel	Migella sativa.
Safed jira	Caraway	Corum carui.
Haldi	Turmeric	Curcuma longa.
Laung	Clove	Eugenia caryophyllata.
Chhoti elachi	Small cardamom	Ellettaria cardamom, true cardamom.
Bari elachi	Greater cardamom	Amomum subulatum.
Nariyal	Cocoanut	Cocos nucifera.
Ajwain		Caryota copticum.
Sonth	Green ginger root	Zingiber officinale.
Kismis	Raisins	Vintis vinifera.
Chiraunji		Buchanania latifolia.
Namak	Salt	
Kala namak	Common salt with sodium carbonate, in sort of fusion.	
Chhoti pipar and bari pipar.	Long as cloves, but thin. Not quite as hot as pepper.	
Har	As thick as cardamom, and a half inch long. Supposed to aid digestion.	

E—FOOD COSTS IN KARIMPUR

The food prices given in the accompanying table are rarely paid. Farmers would not have money to buy food at these rates, low as they seem to us. They produce most of their own food, or exchange food which they have stored, for food or services which others have to offer. When the exchange is made, there is a great deal of arguing, and he who is the best barterer gets the best bargain. Either the seller or the buyer produces balance scales. One article to be exchanged, such as cucumbers, is put into one pan, and barley, corn, rice or almost any food is placed in the other. The exchangers agree on how the scales should hang, according to their estimate of the value of each article. The pan of cucumbers should swing far down if wheat is in the other pan. If there are sweet potatoes in the other pan, they should almost balance the cucumbers. With this in mind, one realizes the futility of measuring a farmer's food expenditure in terms of money. At best, it can only give a general idea of comparative values. The figures here given we

believe to be as accurate as can be found. They were recorded by our clerk, in the household of farmer caste in which he lived. If we were to list the prices which we were actually paying for the same articles at the same time, our figures would be much higher—twice as high in some cases. A white face always sends prices up.

Prices of foods in Karimpur in 1928

Article	Number of pounds purchased for 1 rupee
Wheat	18
Barley	24
Maize	20
Rice	14
Spiked millet	16
Great millet	17
Gram	30
Urd	16
Mung	16
Moth	10
Pigeon pea	32
Milk	12
Ghi	1.25
Mustard oil	3
Potatoes	50
Lauka (kind of pumkin)	50
Lauki (kind of gourd)	33
Turayan (kind of gourd)	43
Okra	27
Cauliflower	43
Egg plant	66
Green figs	33
Bitter melon	27
String beans	66
Radishes; with tops	66
Carrots	66
Egyptian arum	43
Khata labhera (blossoms)	25
Khata labhera (green fruit)	43
Cluster bean, with pods	65
Cow pea	65
Field pea	33
Onions	43
Cucumber	33
Sweet potatoes	33
Kacheria (kind of melon)	43
Senda (variety of cucumber)	43
Mushroom	43
Mustard tops	65
Fenugreek (green)	43
White goose foot	66
Gram tops	65
Spinach and dill	43
Nori (wild pot-herb)	66
Onion tops	99
Paintiya	66
Lissua (wild pot herb)	66
Pea vine tops	66
Chaunrai (pot herb)	99
Leaves of Egyptian arum	16
Mangoes	66
Guavas	21

Article	Number of pounds purchased for 1 rupee			
Jaman (kind of plum)	..	..	..	66
Water melon	..	..	..	43
Ber (Indian jujube)	..	..	..	66
Water chestnut	..	..	..	66
Tamarind pods	..	..	..	27
Musk melon	..	..	..	43
Raw sugar	..	..	..	12
Salt	..	..	..	28
Red pepper	..	..	..	3
Black pepper	..	..	..	1
Turmeric	..	..	..	2
Aniseed	..	..	..	5
Coriander	..	..	..	3
Asafoetida	..	..	..	0.2
Cloves	..	..	..	1
Big cardamom	..	..	..	1
Garlic	..	..	..	8
Fenugreek (seeds)	..	..	..	8
Caraway	..	..	..	2

Price of meat

A two-year-old pig, weighing about 75 pounds, was butchered on 10th February, 1928. It was divided into 12 shares plus the head. Each share weighed about $5\frac{1}{2}$ pounds, and cost about \$.15. The head weighed more, and was the most desirable part. Cost \$20.

III—FROM FIELD TO SERVING TRAY

A—THE CARE OF FOODS AT HARVEST TIME

At harvest time, all of the able bodied men and boys of the village and some of the low caste women go out to the fields. Some cut their own crops, and some are employed to cut those of others. The men squat in a row at one end of a field and move slowly toward the opposite end, cutting the grain handful by handful with their sickles as they hunch along. They tie the cut stalks into bundles, binding them with tough grass. When a field is finished, they carry the bundles, usually on their heads, to one of the groves beside the village. We camped in one of these groves and used to watch the men coming in, balancing their loads and dropping them on the large pile belonging to the master of the field.

The millets are treated differently. Women of farmer and water-carrier castes walk slowly through the field breaking off the heads of grain and dropping them into large flat baskets which they carry. Later the men cut the stalks. This job can be postponed until more important crops are harvested.

Rice is cut in the usual way, but is not carried to a grove. It is threshed close beside the field where it has grown.

Most of the grains and pulses are threshed by the treading of bullocks on a threshing-floor. The threshing-floor is simply a circle of ground from which grass and weeds have been scraped. The threshing-floor for rice is prepared beside the rice field. Other threshing-floors are in the groves where the cereal and pulses have been stacked. In our grove there were five and sometimes six threshing-floors being used. On each of them from two to six bullocks were driven round and round day after day. Small boys usually do the driving. A stack of grain about three feet high, covering a threshing-floor with a radius of ten feet, takes three days to be threshed by four bullocks. This varies of course with the activity of the driver. People without bullocks must leave their grain stacked in the grove until some one else's animals are available.

In the threshing, the husks are loosened, and many, but not all, are separated from the kernel. The husks of rice and barley are not loosened, by the treading of bullocks. With these two the threshing simply breaks the kernels from the stalk. The actual husking has to be done later by the women in the courtyards.

Close after the threshing comes the winnowing. The men hold shallow baskets of grain high above their heads, and tilt and jerk them in such a way that the kernels fall to the ground. The chaff is carried away by the breeze. If there is no air stirring, two men

stand behind the winnowers and flap a long sheet, thus making a breeze.

Grain to be sold is weighed out and poured into gunny bags, beside the threshing-floor. The two men who keep large store-houses of grain to loan or sell later in the season to village neighbours, measure their grain into sacks and have their hired helpers carry it to their store-houses. A few others keep their surplus in bags. But most of the products of any harvest—grains, pulses, vegetables, or fruits—are carried home from threshing-floor, grove or field, and poured out on the floor of the courtyard. Whatever remains to be done, is the work of the women.

B—STORAGE AND PRESERVATION OF FOODS

The women shape tall jars of clay which remind one of the tale of Ali Baba. They must have them made and well dried before the harvest. As rapidly as the grain is brought in, they spread it on sheets, on their roped cots, and keep moving the cots so that they may get all of the sun possible within the courtyard. When the grain is thus thoroughly dried, they clean it basket by basket full, and fill the jars with it. Near the base of each jar is a small opening, plugged with rags. Through this, a day's supply of grain can be drawn out.

Pulses to be stored require additional treatment. The women must remove any pods not removed in threshing. Then they soak the pulse over night in water and oil. The quantity of water varies. To five pounds of pigeon peas they add ten pounds of water and three and a half ounces of oil. To five pounds of "mung", "urd", or "moth" they add only four ounces of water and an ounce of oil. After the soaking they dry the pulse in the sun for a day or a day and a half. For this they requisition every cot in the house and every sunny inch of the courtyard. When the pulse is thoroughly dried, they split it in the light stone hand mill described. If a woman does not own such a mill, she tries to borrow one from a neighbour or employer. If she cannot borrow, she pries apart the stones of her flour mill, with a wad of cotton on the top of the pivot, and splits the pulse in it. She may split her whole season's supply immediately after the harvest, or she may take care of enough for three or four months at a time. During the splitting process many husks are loosened. She gets rid of them by winnowing the pulse and sifting it, before storing it in clay jars.

There is heavy work left for the women, in the care of rice and barley. Both of these have been partially threshed by the treading of bullocks. Bullocks' hoofs are able to separate the husks from the kernels of some grains, but not those of rice or barley. This task is left for the women. With an iron-bound wooden pestle, a woman husks her rice or her barley in a stone mortar set in her floor. It is

tiring, strenuous work, and she prefers to do a small portion at a time, as it is needed.

Where there is a supply of a certain grain to be stored, too small to require a tall jar, it is stored in smaller jars, made and baked by the village potter. These are often found in rope baskets, suspended from beams of the family's store-room, off of the courtward. Grain kept for seed may be stored in the same way, or hung in the courtyard on a beam protruding beyond the store-room wall, protected by eaves. The village housewife wages continues battle with the rats and insects which covet her stores, and with the crows which settle on the courtyard wall waiting their chance to swoop down on drying grain.

Drying is not limited to cereals and pulses. Greens, such as the tips of peas and mustard plants, are chopped, and dried on the cots in the sun, and kept in baked clay jars, or in bags improvised from old skirts and shirts. "Mahua" flowers, if not all eaten fresh, are similarly dried. Coriander, the most used of spices, is gathered by the children and dried by their mothers. Mangoes, peeled and dried, are kept in jars to be used later to flavour insipid dishes. Mustard seed is dried and stored, ready to be doled out to the oil-presser when a fresh supply of oil is needed.

The only other forms of preservation within the reach of a village housewife are spicing, preserving in oil, and preserving in salt. Vinegar is not used. The containers in each case are clay jars of various sizes, made by the village potter. Carrots and radishes will keep about a week, if well mixed with spices and covered with oil. The "rai labhera" (small plums) keep longer. And horse-radish, limes and mangoes keep for months. The "rai labhera" and limes are scarce, and hence available to only a few. They require a little oil, and spice. The horse-radish and mango are within every one's reach. Mangoes lend themselves to the greatest variety of preserves. In salt they are acceptable in spices and oil they are a happy addition to a noon day meal, and in raw sugar they are a special treat.

With clay jars or old cloths as her only containers, and a stifling room as her only storing space, there is little more that the village woman can aspire to, in carrying foods beyond their season.

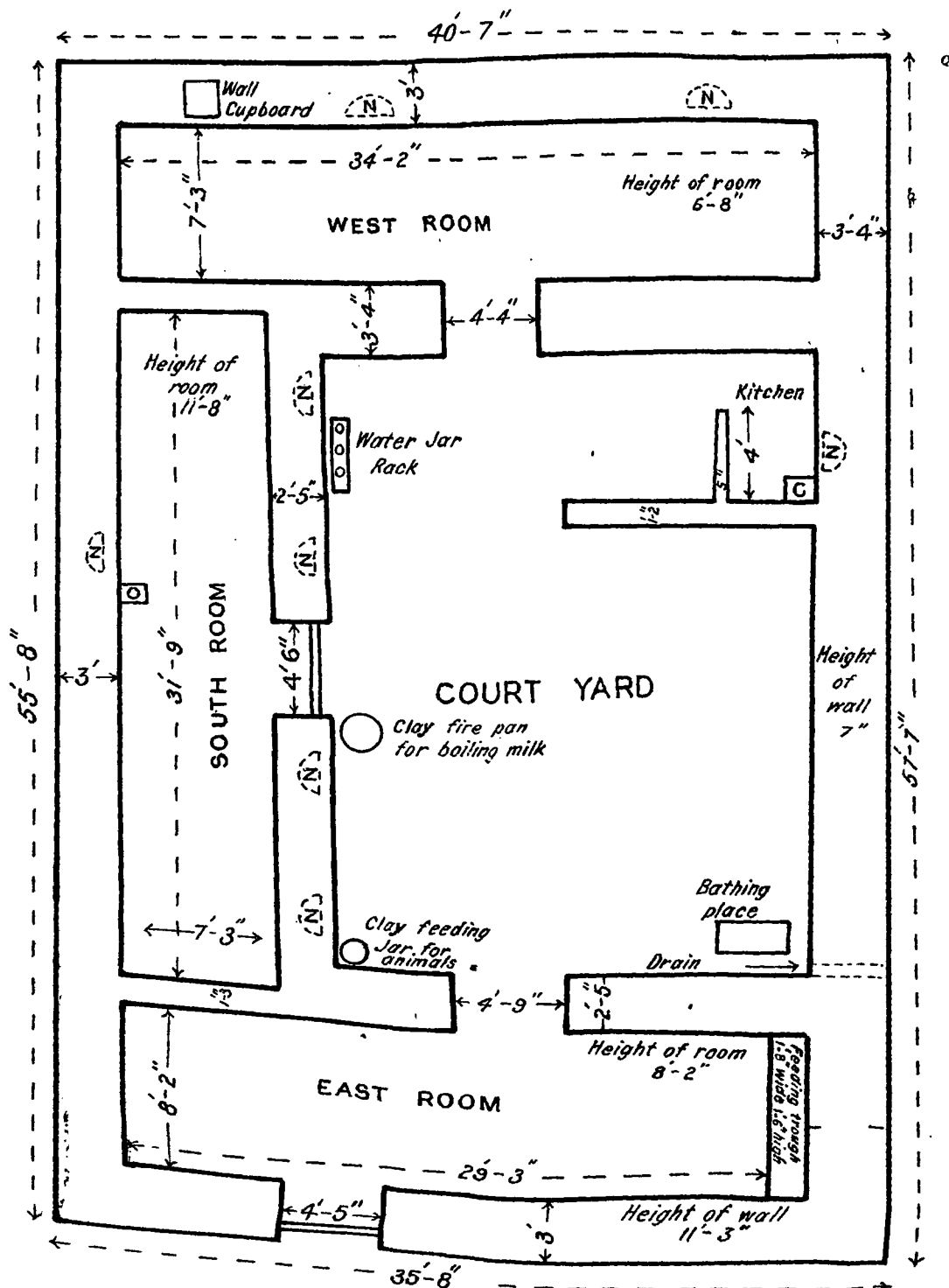
C—EQUIPMENT

Before considering the further processes through which the food materials must go in the home, it will be necessary to study the equipment with which a village woman works. Her work-room is the courtyard in which all family activities are carried on. The earth is her floor, and the sky is her ceiling. From the courtyard she sees only these and the walls of mud around her.

The walls which surround her are made of mud dug from the bottom of a near-by pond. She cannot see over the tops of the walls and,

GROUND PLAN OF A KARIMPUR ENCLOSURE

8 Feet = 1 Inch



more important still, no one can look over the walls at her. If she is a Brahman, her courtyard will be large enough for her to work in, and to spread out her grain comfortably, with plenty of sunshine most of the year, and at least a patch of it crossing the floor in mid-winter. If she is an outcaste, her courtyard will be small, originally high, but her walls will be eroded until low enough to admit abundant sun and air. The women who suffer are those whose courtyards are small, and whose husbands insist upon keeping them in strict seclusion. Such a one is the oil-presser's wife, whose courtyard is cramped, and high-walled. During the rains, she works in puddles, and during the winter she shivers between damp walls which shut out the sun. She and her children are among the most wretched in the village.

The carpenters are as near average as any group in the village; and a diagram of a carpenter's house is shown on opposite. The enclosure is a typical in that it has two rooms off the courtyard. Usually only Brahmans have two, whereas those less than Brahmans should be content with one. In this particular case the second room was added to accommodate extra brothers. It is now falling into disrepair.

The doors of the courtyard lead to store-room or cattle-room, not to the outside world. On rare occasions when a village woman is going to her father's home for a visit or to the wedding of a relative, she swathes herself in a coarse sheet and goes out through the cattle-room. Her only other means of exit is by ladder. If her courtyard has a ladder, she climbs to the top of her wall and looks over at her neighbour, and if no men are at home in her own or her neighbour's house, she drops down into her neighbour's courtyard for a hasty visit. Aside from these rare breaks, she spends her life in her own courtyard, with food-preparation as her chief task. Her children wear few garments, and these are made by the village seamster, and washed by the village washerman. She has no furniture to care for beyond the unvarnished roped cots, used as beds by night and as drying-racks by day.

During the winter weeks, coverings of home spun sheets or padded quilts are used. These she throws over wooden pegs projecting from the courtyard wall. She has no hangings or rugs, or silver or china to care for. If food processes were as simplified for her as they are for us, her life would be easy. But as it is, her work is heavy and slow.

Her activities centre around her "chulha" (fireplace). Generations ago a great-grandmother-in-law made it in a secluded corner of the courtyard and each daughter-in-law since has kept it in repair. There is a supplementary "chulha" in the store-room to be used in stormy weather, but the one in the courtyard is the true family hearth. It is made of mud piled up and shaped so as to protect a small flame and to support a cooking utensil. (The daily care which the

housewife gives her "chulha" will be discussed in connexion with the ceremonies of cooking and eating.) Her fuel is the twigs which the children gather from groves, or the dung cakes which she and other women of the household have shaped.

Almost as necessary as her fireplace is her stone flour-mill. All the grains and pulses which are to be made into bread must be ground in the home mill. The mill is made of two stones, cut like discs about two inches thick and from one and one-half to two and one-half feet in diameter. The housewife has embedded the lower stone in a base of clay, which lifts it to a convenient height from the floor. The upper stone is free to turn on the lower one, being held in place by a peg in the centre of the lower stone which passes through a hole in the centre of the upper stone. The clay base has a diameter several inches greater than that of the stones, so that it forms a border around the outside of the mill. This is trenched to look like a moat surrounding a low stone castle. As the woman turns the upper stone round and round with a wooden peg fitted into a slot near the rim, she pours her grain into the hole at the centre of the stone. As the grain is crushed and ground between the stones it gradually spills out around the edges into the encircling moat. When the grinding is finished, the housewife brushes the flour out into a winnowing basket, and separates chaff and clay-dust from the ground grain. She returns some of the bran to the flour, unless the bread is intended for a special feast. The grinding is heavy, tedious work, and if possible two women share it, sitting facing each other across the mill, each with a hand on the turning peg. One of them pours the grain into the centre hole, without breaking the rhythm of the turning. The steady hum of the grinding stone is one of the earliest morning sounds of the village. In a few homes one finds a "darenti" a mill patterned after the one described, but smaller and lighter. It is used in splitting the pulses. As the supply for several months can be food. For the winnowing and sifting there are baskets and sieves. Cooking utensils are never borrowed, but the "darenti" is regarded differently, although it touches the food.

Before rice or barley can be ground they must be husked. For this the housewife has a pestle and mortar. The pestle is a thick pole about four feet long, bound with iron rings, one of which forms a rim at the bottom. The mortar is a stone cup set into the earth floor of the courtyard. The husking is another strenuous task usually shared by two women. They sit on the floor one on either side of the mortar. Each woman holds a pestle, and turn by turn, each lifts her pestle above her head and brings it down heavily into the rice, some of which is struck, but much of which flies out of the mortar. One of the women keeps brushing the scattered grains back into the mortar, while managing to keep her hand out of the way of the pestles, and not missing her turn. The grain thus treated is not only husked but chipped and broken. However, skilful winnowing saves every scrap that might

the food. For the winnowing and sifting there are baskets and sieves of several sizes and shapes. The winnowing baskets are of reeds. The sieves may be strong with coarse threads or reeds.

The utensils which the village housewife uses are made of brass, iron, stone, clay or wood. When she makes her daily bread (she actually does make it every day), she may mix and knead her dough in a bowl of brass or wood, or baked clay. She pats out the flat round cakes with her hands if the flour comes from mixtures of corn, barley, millets or pulses. If the cakes are of wheat, and especially if they are intended for guests, she rolls them out thin on her small round breadboard, which is of stone rather than wood if she can afford it. To bake her bread, she may rest over her fire a convex iron plate which she brushes with clay, to keep the cakes from sticking. Or she may fry the cakes in deep fat in an iron vessel shaped very much like those which we use for deep-fat frying. She lifts the cakes out of the fat with a long-handled, flat-bowled iron spoon, which may or may not be perforated. And when her bread is ready and her husband calls for it she serves it on a brass tray, always brightly polished. For cleaning her brass she rubs loose a bit of her earth floor, applies it with a knot of grass and much rubbing, and rinses it off.

When she prepares vegetables she rarely removes the skins, but cuts up the whole vegetable with a small sickle. She braces the handle under her toes so that the blade stands upright. Against this she pushes the vegetable. Greens are held in bundles and cut through in the same way. To fry her vegetable, she uses the same iron pan for deep-frying. To boil her "greens" (leaves and herbs), she uses a brass kettle with straight sides and no handles. Both "greens" and vegetables she serves on the brass tray with the bread. The bread is broken off bit by bit and used to dip up the other food. If she is serving guests, she will place bread and vegetables and any other food on clay saucers or dishes made of large leaves bound together with twigs. These can be thrown away when the guests depart. In no case should household utensils or dishes be touched by others than members of the family. When I admire a piece of brass, I always admire from afar.

Every day the housewife grinds the spices to be used in the food. For this she has a stone about an inch thick, about six inches wide and a foot or more long, curving gracefully to a point at one end. On its corrugated surface she lays her spices, sprinkles them with water, then rolls a small, rough stone roller back and forth over them until they form a paste.

Every morning and evening she puts fresh milk on to simmer. For this she uses a baked clay jar, set in a smouldering fire of dung cakes. A separate fire-arrangement is required for this long period cooking.

It consists of a large, shallow basin with a thick base which she has made of clay. In it she places a burning dung cake, with other arranged over and around it, like a nest for the jar of milk. After hours of simmering she pours the scaled milk from this clay jar into another kept for the purpose. And the next morning she pours the clabbered milk into still another clay jar which serves as a churn. Each of these jars has a distinct shape and is called by a different name. The churning paddle is a stick of wood with cross pieces at the bottom. The woman who is to churn loops a rope around the leg of a cot and then twists it at the middle around the paddle, and holds the two ends in her two hands. By pulling one end of the rope and then the other, she rotates the paddle horizontally and keeps it rotating until butter forms. The churned butter is placed in a special jar with other butter and accumulated for a week, at which time it is clarified.

The utensils mentioned, along with the large clay jars which are filled each day with water, our housewife considers necessary to the feeding of her family. With increasing means and increasing family, she may add to the number of these same articles, or she may replace clay with iron, or iron and wood with brass. Or she may add brass cooking utensils and serving dishes of varied sizes and shapes. She may aspire to a serving dish or cup of bell metal, which is more expensive than brass. Beyond this, her desires do not go.

The following list of utensils indicates the variety used, and the relative importance of the different articles, as shown by their frequency. The list includes forty-eight households which represent all castes and all degrees of prosperity. I have divided them roughly into what our village friends call "rich", "moderate", and "poor". They would add to the list "very poor", but these I have included under "poor". There is no way of estimating the actual wealth of a family. Those who appear poor are very apt to have money and jewellery hidden away in a wall or the ground. Indebtedness is no register, as most of the village is in debt:

List of articles, with percentage of rich, moderate, and poor homes, in which each occurs

Local name	Description	Classification of homes		
		5 rich	22 moderate	21 poor
		Per cent.	Per cent.	Per cent.
Chakki ..	Grinding stone ..	100	100	86
Darenti ..	Light mill for splitting pulses	60	24	5
Musal ..	Pole-pestle for husking rice ..	100	100	100
Dahkli ..	Stone mortar for rice ..	100	100	100
Charpai ..	Roped cot on which foods are dried.	100	100	100

List of articles, with percentage of rich, moderate, and poor homes in which each occurs—(concluded)

Local names	Description	Classification of homes		
		5 rich-	22 moderate	21 poor
		Per cent.	Per cent.	Per cent.
Chalni ..	Round wooden sieves strung with thread.	100	100	95
Sup ..	Reed winnowing basket ..	100	100	100
Parat ..	Brass mixing bowl ..	80	50	14
Tasla ..	Iron mixing bowl ..	80	32	..
Kanthani ..	Wood mixing bowl ..	100	64	62
Katheli ..	Smaller wood mixing bowl ..	100	73	67
Kunra ..	Clay mixing bowl ..	80	5	..
Kunri ..	Smaller mixing bowl ..	100	55	24
Pata (w) ..	Wooden rolling board ..	100	100	95
Pata (s) ..	Stone rolling board ..	80	41	33
Belan ..	Wooden rolling pin ..	100	85	95
Tawa ..	Convex iron griddle ..	100	100	100
Karahiya ..	Iron pan for deep fat frying ..	100	91	86
Hansiya ..	Small sickle for cutting vegetables.	100	95	86
Sil batta ..	Stone on which spices are ground.	100	100	100
Lorhwa ..	Roller for grinding spices ..	100	100	100
Batua ..	Brass kettle for boiling greens ..	100	77	52
Patili ..	Small cooking pot ..	80	45	24
Mathni ..	Churn ..	80	77	38
Chamcha ..	Long handled iron spoon ..	100	100	90
Kalcha ..	Different type of iron spoon ..	100	100	100
Chamcha (wood) ..	Wooden spoon ..	..	..	19
Chimta ..	Iron fire tongs ..	100	86	57
Chimti ..	Smaller iron tongs ..	20	9	..
Sansi ..	Tongs curved for lifting kettles ..	80	9	..
Thara ..	Clay water jar ..	100	100	100
Kalsa ..	Brass water jar ..	100	59	..
Chilamchi ..	Brass wash basin ..	20	..	..
Silafchi ..	Brass basin ..	20	..	..
Thali ..	Brass serving tray ..	100	95	86
Phul Thali ..	Tray of bell metal ..	80	45	5
Rakabi ..	Brass plate ..	80	18	..
Lota ..	Brass drinking bowl ..	100	100	62
Phul lota ..	Drinking bowl of bell metal ..	40	..	..
Bela ..	Brass cup in which food may be served.	100	100	86
Phul bella ..	Bell metal cup ..	60	27	9
Gilas ..	Brass glass ..	100	86	67
Ghanti ..	Small brass water vessel ..	80	68	81
Tarazu ..	Balance scales ..	100	95	76
Pandan ..	Box containing betel condiments ..	60	9	5
Clay saucers ..	Cups and jars ..	100	100	100

D—DISHES PREPARED FROM—

Cereals

Every day the village woman makes fresh bread for her family. As has been mentioned, she makes it of wheat, barley, or mixtures of

these with pulses, from the spring harvest until the end of the rainy season. From the end of the rains until spring, she makes it of maize, different millets, and perhaps rice, with a wheat mixture occasionally as a treat.

Whatever the grain, she suns it well the day before she uses it. Early on the day when she is to bake it into bread, she, with the help of another woman of the family, grinds and winnows it. She mixes the flour with water in her mixing bowl and kneads it by alternately working it vigorously with both hands, and pounding it with her knuckles. When she considers it "soft enough," she takes up a ball of the dough and works it further in her hands, before patting and rotating it into a round, flat cake. While she turns the cake in her hands, she pinches the edges. She brushes a daub of wet clay over her thin, convex griddle, to keep the cakes from sticking. As each cake is shaped, she flops it on to the griddle. There is only room for one cake at a time. She turns it over with her long, flat iron spoon. While the first cake cooks, she shapes the second. As soon as the first is done well on one side, and slightly on the other, she stands it upright inside the fireplace under the griddle, to toast, while the second cake cooks above, and she shapes a third. Meanwhile, she must keep her fire alive by blowing it and adding fresh fuel. Her fuel may be small twigs, gathered by the children, or dung which she has gathered in her stable, or which the children have collected in fields or on roads, and which she has mixed with chaff and water and shaped into cakes of convenient size for her fireplace. The bread which toasts close besides the fire, must be watched lest the burning fuel touch it, or lest it topple over into the flame. If its edges have been pressed together properly, the cake swells out like a balloon, as the moisture inside turns to steam. At this point, the cook lifts it out with her iron fire tongs, and bangs it against anything convenient to drive out the expanded air. The steps in bread making are listed on page 35.

The women prefer wheat, or mixtures in which wheat appears, not only because of the better flavour, but because wheat flour is more satisfactory to work with. When making wheaten cakes, the housewife can roll them out with her small rolling-pin, after patting them between her hands. Cakes of other grains fall apart if she tries to make them equally thin. Corn cakes are a cross between cornmeal mush, and corn bread. Cakes of the little millet look like clay, before they are baked. They are mealy and have a raw taste. Cakes of sorghum are brown with a purplish tint, and are slightly bitter, and mealy. Cakes of Italian and of Poorman's millet are still less desirable. Wheat is always used for bread which is to be fried in deep fat. When fried, the bread is known as "puri" as distinguished from the toasted bread which is "chapati". Both "puris" and "chapatis" are covered by the general term "roti". The occasions on which "puris" are required are discussed under the ceremonial significance of food.

Parched grains provide a useful variation in village fare. The grain-parcher is kept busy most of the day when a fresh crop of grain is cut. At other times he keeps his furnace going late each afternoon. The farmer or one of his children brings the grain to be parched. The parcher has a clay furnace in which he burns leaves and twigs. In the furnace he heats clay jars of sand. He mixes the grain with the hot sand and keeps mixing them until the grain has popped or puffed, or browned. Then he sifts out the sand, and gives the grain back to the farmer, after taking out a portion as his pay. The grain thus roasted may be eaten as it is. Or the farmer's wife may grind it coarsely for his morning meal. If there is buttermilk, it is added to the ground, parched grain. If not, water is added, and a little raw sugar, if there is any. If not, there is always salt. The daily ceremonies which must precede any cooking make it impossible to prepare an early cooked breakfast. This ground, parched grain, called "satua," solves the breakfast problem for the farmer, and perhaps for the children. The women and children usually eat cold food left from the day before, but the men scorn this.

If the grain to be parched or roasted for "satua" is fresh, it goes straight to the parcher. But if it is dry—as it is most of the year—the farmer's wife must soak it for twelve hours, and sun it for six hours before her husband carries it to the parcher. Corn, barley, or a combination of barley and gram or of barley and peas, are the most popular. A quantity is sent to the parcher that will supply the family with "satua" for several weeks, or perhaps, months. A prosperous farmer may carry a maund and a half (about one hundred and twenty pounds) to the parcher's, while his poorer neighbour carries about ten pounds. And each hopes to have "satua" enough to feed himself for the same period. When the parched grain is brought home, the women pound it in the stone mortar set in the courtyard floor. This loosens the outer skins. Then they clean it, and grind a week's supply at a time.

At harvest time there is a feast of parched foods in which the parcher has no share. While men rest from harvesting in the fields, or while they sit with their brotherhood after a strenuous day's work, they gather a pile of leaves or stalks and scatter the heads of green grain or the pods of legums within the pile. They light it from a scrap of smouldering cow-dung, always on hand for lighting pipes. When the blaze dies down, they scatter the charred remains and pick out the smoking heads of grain. These they rub between their palms until the kernels are freed. Some are still green; others are charred black. But the combination is very agreeable. The women and children manage to get a share of the heads for roasting, from the stalks which the men bring home at the close of each day's work in the harvest fields. Peas, wheat, and barley are thus treated and eaten in March and early April. During the harvest at the end of the rains,

the heads of both large and small millets are laid on the fire, and the green ears of corn are husked and turned in a blaze or in the embers of a fire of twigs. The corn is field and not sweet corn, but it is good roasted. These popular products are available to everyone in the village, for at these seasons every able man has a chance to help some farmer. And those who cannot, plan to be present when generous neighbours indulge. The amount of parching done in the fields depends on the good will of the owner of the field. If he is miserly, or work is pressing, he may allow little time for rest and feasting. But ordinarily, it is an accepted part of the day's routine.

Other dishes in which cereals appear, are prepared for certain festivals. These come so seldom that the foods are not of great significance from the point of view of nutrition. In the eyes of the village housewife they are tremendously important and consume much of her conversation and time. They are at the end of this chapter, along with other festive dishes.

Rice is treated differently from the usual cereals. For bread it must be husked with mortar and pestle, then ground. It makes a very soft dough. The cook keeps her hands moist while handling it. It is toasted like any other bread. Rice is used for bread only when there are no other grains on hand.

It is more often used in "khichri." Water is boiled in a brass kettle, and rice and a split pulse are dropped in together and cooked. They may be in equal proportions, or there may be less pulse.

A variation of this with a decidedly different flavour and "feel" is "dal bhat." The rice and split pulse are cooked separately and combined when almost dry. The women of the family drink the rice-water.

Sometimes rice is soaked and later fried in "ghi" (clarified butter) and salted. Oil may not be used for this. "Khir" is a dish which is limited to households where there is enough milk so that all is not needed for "ghi." Rice is boiled in milk and sweetened (one-half pound rice to about 3 quarts milk). Villagers say that there should be as much raw sugar added as there is rice. Just before serving, a little "ghi" should be added.

A variation of this dish, which is available to a much larger number, is "Raskhir." The juice of the sugarcane is boiled, and rice cooked in it. It has a flavour which we think disagreeably strong, but village folk eat quantities of it with pleasure. A cross between these two, is a dish called "maheri," in which buttermilk and raw sugar are added to cooked rice.

We can get puffed riced in the market town during most of the year. But in the village it only appears at the time of the festival of lights, in the autumn. Then the grain parcher buys the better variety of rice necessary and puffs it in his hot sand. Everyone in the village

comes to him to get some. Other occasional uses of rice will be described under special dishes.

STEPS IN MAKING TOASTED BREAD

Maize

Process	Time consumed	Weight before	Weight after
Bringing dung from drying pile and bringing water.	20 minutes.		
Pounding with pestle	3 minutes ..	3 lb. ..	3 lb.
Winnowing, to remove insects, husks, etc.	2 minutes ..	3 lb. ..	2 lb. 13 oz.
Grinding	1 hr. 5 min.	2 lb. 13 oz.	2 lb. 9 oz.
Sifting	2 minutes ..	2 lb. 9 oz. . .	2 lb. 8 oz.
Making into cakes	45 minutes	Water + 2 lb. 8 oz.	4 lb. 3 oz.

Wheat

Pounding with pestle and winnowing to remove insects, husks, etc.	30 minutes	3 lb. ..	2 lb. 12 oz.
Grinding	1 hour ..	2 lb. 12 oz.	2 lb. 10 oz.
Sifting	3 minutes	2 lb. 10 oz.	2 lb. 9 oz.
Kneading, rolling, cooking		Water + 2 lb. 9 oz.	4 lb.

Number of cakes made from one pound of grain

	<i>Cakes</i>
Maize	3
Wheat	7
Large millet (sorgum)	7
Small millet	6
Tirra (wheat, barley, gram)	6
Gojai (wheat and barley)	7
Rice	7
Barley	8
Bejai (barley and peas)	8
Wheat—grain	8
Wheat (cakes fried in deep fat)	10
¾ c. clarified butter. ¼ c. left after frying.	

Pulses

When we visit in a village home, our host always asks hospitably if we have had our "dal roti" (split pulse and bread), which is his idea of a satisfactory meal. The term "dal" is applied primarily to the dish of cooked legumes served with bread. It also applies to any of the pulses, after they have passed through the splitting process and are like split peas. Before this stage there is no inclusive class name, and each pulse is known by its plant title. If turned to some purpose before being split, a special descriptive term is used for the particular product. For instance, split peas may be referred to simply as "dal". If cooked green, they are "matar ki tarkari".

(peas as vegetables) or if toasted they are "matar ka chabena". When a man goes to buy "dal", he must then designate from what plant the desired "dal" comes, and his wife in taking "dal" out of storage for some particular dish, is careful to select the split product appropriate for her purpose. For the ordinary "dal" to be cooked and eaten with bread, she has no choice beyond the supply on hand or her husband's digestive powers. The uses of the pulses, before and after they are split, are outlined at the end of this section.

When "dal" is to be served, the housewife gets out the desired amount the day before. If she has "mung", "urd" or "moth" she pounds it with her pestle, then soaks it overnight. By morning she can rub off the loosened husks under water and skim them from the top. She does not throw the husks away, but saves them and combines them with barley and wheat in making bread. If she is in a hurry, she may omit the soaking and let the family eat husks along with the pulse. Field peas do not require soaking, as husks come off during the splitting. She heats water (about two quarts to a pound of "dal") and while it is heating, she prepares her spices. She grinds red pepper and half a root of turmeric on her spice-stone, and adds them to the boiling water. Then she adds the "dal" and salt (one teaspoonful), and cooks it until it is pulpy when rubbed between the fingers (about thirty minutes). When it is almost done, she grinds coriander (about twenty seeds) and adds it to the "dal". If she has cinnamon, cloves and cardamom, she adds them as well. To improve the flavour further, she may put a teaspoonful of clarified butter on the tip of the big iron spoon, and drop a few chips of asafoetida into it. She heats this until it sizzles, then stirs it into the "dal" and covers it quickly with a wooden lid. Our village friends assure us that the asafoetida prevents flatulence.

The "dal" is quite soupy, but any one brought up in the village knows how to eat it efficiently, if not noiselessly, by dipping it up with pieces of bread. We like the flavour of all the "dals," but "mung", "urd", and pigeon pea have a slippery feeling which is unpleasant. Cooking the husks with the pulse, relieves this somewhat. Field peas may be cooked as these other "dals", making a more appetizing dish at least for us.

Certain "dal" dishes remind one of meat substitutes, although to the villagers, meat is our "dal" substitute. One such dish is "mungauri" in "jhori". To make this, the farmer's wife takes one pound of "mung" from her store, and soaks it to loosen the skins. She rubs it between her hands and washes it until the pulse is clean. She then grinds it on her spice-stone, handful by handful, until it is a paste. To this mushy product she adds a teaspoon of salt. Into her pan for deep-frying she pours $\frac{1}{3}$ cup of mustard oil or "ghi" (clarified butter). If it is mustard oil, she heats it until it becomes clear and the odour is gone. Then she drops the "mung" into the hot oil or "ghi",

She does this by taking up a handful and shoving off a bit at a time with her thumb. It forms irregular lumps about three-fourths inches in diameter, which she removes from the hot fat when brown. These may be eaten as they are, but should be served in "jhor". She makes the "jhor" by adding water to more "dal" paste and frying the mixture in a tablespoonful of "ghi". For flavour she adds a few seeds of "-methi" (fenugreek). She stirs it occasionally, but does not scrape loose that which sticks to the pan. She then adds turmeric and salt to taste, and still later adds coriander, black and red pepper, one cardamom, three cloves and a small stick of cinnamon, all ground together. At first this "jhor" is an unappetizing, brown soup somewhat lumpy. The spices turn it to a lighter brown and further cooking makes it a thick gravy. When it is done, the fried cakes of "mungauri" are dropped into it. The product is very much like hamburger cakes in gravy. These same cakes, "mungauri", can be cooked with spiced potatoes, in which case it seems still more like a meat dish.

"Mithori ka jhor" is a similar dish. When a woman makes it, she cleans her "mung", then grinds it like flour with her heavy grinding stone. She adds a touch of asafoetida and red pepper, and makes it into a thin batter. This she drops bit by bit into a kettle of boiling water. As soon as the little cakes or lumps are firm, she takes them out and dries them on a roped cot in the sun. She can put them away and use them from time to time to vary her pulse dishes. When she wishes to serve them she browns them in oil or "ghi", and adds buttermilk, thickened with a flour of gram—one-fourth pound of flour to two-thirds quart of buttermilk.

Still another dish on the meat-cake order is made by preparing and frying small flat cakes of gram flour, and adding buttermilk. The cakes are "danre" and the gravy "karhi". It tastes rather sour, an unfamiliar flavour to us in gravy. It should be eaten with rice or bread of some wheat mixture. The "danre" of gram, is crumbly, whereas the "mungauri" made of "mung" is slightly tough.

Pulses may be combined with cereals in bread. They make a stickier dough which is harder to handle than a dough of wheat or corn. They also add a distinct flavour of partially cooked peas. A favourite village dish is a wheat cake with pulse filling. To make these cakes the housewife makes a dough of wheat flour as for bread, but adds more water to make it softer. To one pound of wheat flour, she makes a filling of six ounces of "urd", soaked and cleaned and rubbed on her spice stone to a paste. She spices it with red pepper, three cloves, a stick of cinnamon, forty coriander seeds, one cardamom and twenty seeds of aniseed, a touch of asafoetida, and a teaspoon of salt. She takes a ball of dough in her hand, flattens it out, lays some of the filling on it and draws up the corners to cover the filling. Then

she rolls it out, like a wheat cake, and drops it into hot fat. It puffs and browns, but loses none of its filling if properly prepared. When finished it makes seventeen cakes, weighing two pounds. When eaten hot, these filled cakes are delicious. The difficulty with most of these pulse dishes is that they should be prepared immediately before serving. This is one reason why village feasts are always several hours late.

Although pulses are used chiefly as "dal", dried and split, they make a distinct contribution before reaching this stage. The tender tips of the growing plants of field peas are cooked as greens, or they may be cooked with potatoes as a regular vegetable dish. Small potatoes are cut in half and browned in "ghi", which is flavoured with asafoetida. A little water is added, along with salt, red and black pepper, cloves, coriander, and cardamom. The pea tops are added and the whole is cooked until the potatoes are tender. Green pea pods may be cooked with potatoes in the same way.

The long pods of the cow pea may serve as a vegetable. If they are green enough, they are cut up with the sickle, browned in a little oil or "ghi" with turmeric, black and red pepper, cloves, cinnamon cardamom, coriander and salt. Then a little water is added, in which the cut up pods are cooked until tender. At the last a thin paste of gram flour and buttermilk is added. If the pods have begun to dry, they must be removed and the peas cooked without them.

The cluster bean is chopped up and cooked in the same way, but without any addition of buttermilk. Most of the water is boiled away. Both these cluster bean and cow-pea can be dried in their pods and stored, to be used later as a vegetable dish.

Like the cereals, pulses are popular when roasted, or parched. Sometimes they are roasted in their pods while green, but ordinarily they are first shelled and dried. When parched they may be eaten just as they are, like the gram which carries many a traveller through days away from home. Or they may be ground coarsely with parched cereals into "satua" for the farmer's breakfast.

Vegetables

The vegetables which are most abundant are often eaten raw between meals, as we eat fruit. During the carrot season one sees the children, especially in the quarters where vegetable growers live, gnawing at raw carrots while they creep after their mothers or play together in the lanes. The same is true when sweet potatoes are plentiful. The sweet potatoes may be partially roasted in a bonfire built in the lane or on the courtyard floor. And in the hot weather, men, women and children may be seen feasting on long green cucumbers. Roadside vendor stalls and religious fairs abound in cheap cucumbers so that one cannot miss them, at home or abroad.

Pulses used in the homes of Karimpur

Pulse	Comparative amounts used	Uses when not split	Preparation of split product—"Dal"		Use of split product—"Dal"
			Processes at time of harvest	Processes at time consumed	
Pigeon pea	More than any other as "dal". But less than gram for total uses.	1. Roasted ..	Soaked, dried, Split, Winnowed. Fried further. Stored.	Pounded (mortar and pestle). Winnowed. Cooked.	1. Boiled with spices. 2. Ground. Made into bread, alone, or with wheat and barley, wheat and gram or gram alone.
Gram ..	Total used, is more than other pulses.	1. Green pods, as vegetable. 2. Roasted plain. 3. Soaked, fried in "ghi", salt, and pepper. Roasted. 4. Roasted. Ground with wheat and barley, or wheat and peas for morning "sata." ..	Halfsplit, Winnowed. Dried further. Stored. Other half similarly treated in September for remainder of year.	Pounded. Winnowed. Cooked.	1. Boiled with spices. 2. Ground into flour, to be used in special sweets. 3. Ground and made into bread, alone, with pigeon pea, with wheat and barley, or barley.
Field pea..	Less than gram or chick pea. More than urd, mung, or moth.	1. Tops of plants as greens. 2. Green pods and green peas as vegetables. 3. Dried, used as vegetable. 4. Roasted in pods. 5. Roasted. Ground with barley, or barley and gram for "sata." ..	Stored unsplit. Later enough for 3 or 4 months split at a time.	Cleaned ..	1. Boiled. Only eaten in this way when other "dals" are gone. 2. Ground, with barley, or wheat and barley, to make bread.

Pulses used in the homes of Karimpur—(continued)

Pulse	Comparative amounts used	Uses when not split	Preparation of split product—"Dal"		Uses of split product—"Dal"
			Processes at time of harvest	Processes at time consumed	
Urd ..	Less grown than peas. More used as "dal."		Rubbed with oil. Split. Stored.	Pounded. Soaked. Husks rubbed off.	1. Boiled with spices. 2. Cooked with rice. 3. Cooked separately and added to rice. 4. Ground with wheat or wheat and barley for bread. 5. Ground for special cakes.
Mung ..	Slightly less than urd.	Roasted and ground for sweet-cakes.	Rubbed with oil. Split. Stored.	Pounded. Soaked. Husks removed.	1. Boiled with spices. 2. Like urd, above. 3. Ditto. 4. Combined with wheat, or barley, or both, and ground for bread. 5. Ground for sweet-cakes. 6. Ground and used in meat-like dishes.
Moth ..	Little ..	1. Roasted. Ground for sweet-cakes. 2. Roasted alone or, with maize and ground for morning "satua."	Rubbed with oil. Split. Stored.	Pounded. Soaked. Husks rubbed off.	1. Cooked with spices. Especially for invalids. 2. Mixed with other pulses and millet, and ground for bread. 3. Combined with "mung", in meat-like dishes.

Cluster-bean.	Little used by men. More for animals.	1. Cut up fresh. Cooked as vegetable. 2. Dried. Stored. Soaked. Cooked as vegetable.			
Cow-pea ..	Little ..	1. Cooked fresh. 2. Dried. Stored. Soaked. Cooked as vegetable.			
String beans	Small amounts grown by Kachhi vegetable growers.	1. Cut up. Strings removed. Cooked as vegetable, usually with potatoes.			

The vegetables which grow less abundantly are cooked and eaten with bread. When there is a vegetable dish, the pulse is usually omitted, unless there is great prosperity in the home, or a guest. Practically the same plan is followed in preparing all vegetables. Seeds and other inedible portions are removed. Most skins have been found edible, and remain. Potatoes are never peeled. Neither are plantains. The vegetable is cut up with the small sickle mentioned. Every village girl learns to brace the handle of the sickle firmly with her toes, and press the vegetable against the blade, one hand on either side of the blade.

A tablespoonful or two of " ghi " where there are milch animals, or mustard oil where there are none, is heated with a little fenugreek or in some cases asafoetida, in the pan for deep frying. When the fenugreek is well browned, the chopped vegetable is added, with enough water to keep it from burning. While it cooks spices are added, varying from salt, pepper and coriander in poorer homes, to these plus cloves, cinnamon and cardamom in prosperous families. The yellow-green, spice-coated, oily product is partly mush and partly in lumps. None of the liquid is poured off. It is eaten with the help of torn-off bits of bread. In appearance it may not be appetizing, but it is delicious.

Potatoes are a popular base for this vegetable dish during the autumn and winter months. And almost any vegetable may be added to them. Egyptian arum, similar to dasheen corms, is available as potatoes decline, and it makes a satisfactory base. The vegetables used in this conventional vegetable dish, either with potato or Egyptian arum, or with each other, or alone, are carrots, radishes (alone or with tops), sweet potatoes, cauliflower, cabbage, egg plant, okra, yam, tops of young pea plants, field peas and cow peas with or without pods, string beans, and cluster beans, and all the varieties of cucumbers and gourds available. Mushrooms are sometimes included. And fruits, such as mangoes, plantains and melons may be used in this way.

" Reota " is a dish in which the village cook combines vegetables and buttermilk. She may make it of white goose-foot, potato, pumpkin or gourd. She boils the potherb or vegetable, then cooks and drains it. She wraps a bit of asafoetida in cotton, and sprinkles oil on it. This she lays in a smouldering dung cake, and over it she inverts the vessel in which the " reota " is to be prepared. This vessel should be of baked clay, to absorb the fumes better. While the asafoetida fumes, she rubs the vegetable on the spice-stone to a paste. Next she uses the stone for the necessary spices—small red pepper, one seed of black pepper, one teaspoonful coriander seeds, one clove, and about three-fourths teaspoonful salt. Then she mixes the spices in with the vegetable, and rubs them all together on the spice-stone. She sets the clay jar upright and pours buttermilk into it, and puts

on the wooden lid quickly. Then she scrapes the vegetable and spices into it, and again puts on the lid. She serves it cold. It looks like a mash, and is quite attractive when green vegetable is used. When one becomes accustomed to the flavour, it is very welcome in hot weather.

Similar to "reota" is the vegetable dish in which buttermilk and gram flour are blended and added to green peas or beans which have been cooked until tender. One other successful vegetable dish is made from the leaf of the Egyptian arum. It is not prepared as much by village women as by those in town. The large leaf is opened out and covered with gram flour and spices. Then it is rolled up like a jelly-roll and sliced off as a roll is sliced. The round, filled slices are fried in "ghi" or oil. It is one of the best tasting of vegetables.

The following table (pages 44 and 45) gives the ordinary procedure followed in preparing vegetables. Vegetables representing various classes and various methods of treatment have been chosen. To us, the differences in method are slight, but to the village cook they are very important.

"Achar," which approaches our pickles, is made from carrots, radishes, beans, and horse-radish, and onions, in low caste homes. When a farmer brings in a generous supply of any of those, his wife uses a portion for "achar." She cuts up the vegetable as for the ordinary vegetable dish. She scrapes and washes carrots and onions. She strings the beans and removes the tough fibrous skin of the horse-radish. The last two she cooks. When prepared, cooked or uncooked, she spreads them in the sun to dry. While they dry, she grinds on her rough spicestone: husked mustard seed, coriander, black pepper, red pepper, turmeric, with perhaps cloves and big cardamom. She grinds these dry, not moistened as she does for the usual vegetable dish. She puts both vegetables and spices in a clay jar and stirs them together well. Last, she adds enough mustard oil to cover the vegetable with a spicy, oily coat. Beans are ready in twenty-four hours. The others she must shake and sun daily for four or five days. They must all be eaten soon after they are ready, as they rapidly ferment.

Methods of Preparing Vegetable Dishes

Preliminary process	Cooking procedure ordinarily followed	Spices	Variations in method
Potatoes : Cut up. Skins not removed. Washed after being cut up.	Fat in kettle, with fenugreek, heated. Potatoes added, and enough water to show at edges. Other spices. Cooked until potato tender. Any water left is served with it.	Fenugreek. Black and red pepper. Coriander.	Boiled, peeled, mashed. Cooked in fat in kettle with usual spices plus turmeric. Butter-milk added. Cooked fifteen minutes.
Egyptian arum : Boiled. Skins removed. Water thrown away. Chopped fine.	Fat heated in kettle with fenugreek. Arum and little water added. Spices added. Cooked until tender, and water boils away.	Fenugreek. Pepper. Coriander. Turmeric.	Same as ordinary, except that buttermilk is added in place of water.
Egg plant : Cut up. Washed.	Fat and fenugreek heated in kettle. Egg plant added and a little water. Cooked until tender. Water boils away.	Fenugreek. Dried Mango. Coriander. Pepper.	1. Like ordinary, combined with potatoes. 2. Like ordinary, with gram added.
Mustard tops : Chopped up. Washed. If dried—soaked.	Fat and asafoetida heated in kettle. Mustard and very little water added. Other spices. Water not poured off. Served with it.	Asafoetida. Pepper. Coriander.	1. Like ordinary, combined with potatoes. 2. Boiled as "greens."
Radishes : Cut up, leaves and radishes. Washed.	Fat and asafoetida heated in kettle. Radishes and tops added. Small quantity water. Spices. Cooked until radishes tender and water boiled off.	Asafoetida. Pepper. Coriander.	1. Pickled. 2. Tops cooked as "greens."
Radish seed pods, unripe. Cut up into small pieces. Washed.	Fat and fenugreek heated in kettle. Pods added. Also cut up potatoes, and water enough to show. Spices. Cooked until potatoes tender, and no water left.]	Fenugreek. Pepper. Coriander. Low castes—onion.	
Water Chestnuts : Skins removed.	Fat and fenugreek heated in kettle. Nuts added with little water. Spices. Cooked until tender. Water left is poured off.	Fenugreek. Cardamom. Pepper. Turmeric. Coriander.	Roasted.

Turayan: Skins removed. Cut up. (Kind of gourd).	Aniseed and fat heated in kettle. Gourd added. Little water. Spices. Cooked until tender. Water left is poured off.	Turneric. Coriander. Aniseed. Pepper.	1. Same as ordinary, combined with Egyptain arum. 2. Or cooked and mashed in buttermilk.
Lauka (kind of pumpkin): Skin scraped off. Cut up. Seeds removed. When green, skin and seeds remain.	Aniseed and fat heated in kettle. Pumpkin and little water added. Cooked. Spices added. Water boils away.	Aniseed. Pepper. Coriander. Turmeric.	1. May add gram. In this case, is only eaten by immediate family. 2. May be added to buttermilk.
Cluster bean: Cut up. Washed (green in pods).	Asafoetida and fat heated in kettle. Beans added and a little water. Spices Cooked until tender. Water remaining served with beans.	Asafoetida. Pepper. Coriander.	Same as ordinary, combined with potatoes.
Cauliflower: Cut up, flowers, and stalks all together. Washed.	Fat and fenugreek in deep brass kettle—not frying kettle. Cauliflower added. A little water. Spices added. Cooked until tender. Water kept.	Fenugreek. Blackpepper. Cloves. Coriander. Turmeric. Cardamom. Cinnamon.	When cooked with potatoes, usual frying kettle is used. Red pepper and turmeric mixed with vegetables before cooking. Other spices at end.
Cabbage Cut up. Washed.	Fat and fenugreek in kettle. Cabbage added. Little water. Spices added. Cooked until tender and water boiled away.	Fenugreek. Blackpepper. Cloves. Coriander. Turmeric. Cardamom. Cinnamon. Low caste —onions.	Same as ordinary, combined with potatoes.
Karela: (Bitter melon). Skin scrapped off. Washed. Seeds remain.	Melon stuffed with spices, plus dried mango, and onions (if low caste). Partially fried, then water added. Cooked until tender. Water remaining, poured off.	Coriander. Pepper. Fennel. Mustard. Asafoetida. Aniseed.	May add gram to filling.

Greens

Certain vegetables are boiled in water in a deep kettle, without the addition of fat. When prepared in this way they are designated as "sag"—greens. Potherbs, tops of growing pulse or mustard plants, radish tops, leaves of Egyptian arum, dill, and "palak," a leaf resembling our spinach, may all be cooked as "sag." During a few months, fresh green leaves are available. Some of them are dried and stored for later use.

When a village woman plans to cook "sag," she cuts up the leaves by pushing a bundle of them against the upright blade of her sickle, layer by layer. She has learned to cut them very fine in this way, without slicing her fingers with them. She then washes the leaves and cooks them in water in a straight, deep brass kettle. She uses one quart of water to one pound of vegetables. The water is warmed and salted before she adds the vegetables. After it has begun cooking, she adds "dal" of "mung" or "urd" (one-third cup to one pound vegetables). She is careful to add it so that both "dal" and leaves will be finished at the same time. To lend flavour she adds several slices of dried mango. When she is ready to remove the kettle from the fire, she adds a small amount of wheat flour (about one-fourth cup) slowly while stirring. She explains that "without flour the 'sag' will be by itself and the water by itself." The flour binds the whole. As soon as she removes it from the fire she heats a teaspoonful of "ghi" and a broken up clove or a chop of asafoetida, in her iron spoon over the flame. When it is sizzling she plunges it into the "sag" and covers it quickly with a wooden lid.

An old village woman once taught me this song :

"O daughter-in-law, today I want the leaves, the tender leaves
plucked from the tops of young grain in the field.

Tomorrow it will be fenugreek that I require.

On Wednesday I myself shall nip the pale mustard tops and
you will cook them delicately in oil.

On the day following a wild potherb will do.

On Friday still another, much more satisfying to the hungry—
the yam—Don't forget.

And after that, egg plant will follow, stewed and spiced.

The squash or perhaps the bitter melon, we shall leave for
Sunday.

Always remember, O wife of my son, I have no taste for bitter
melons, often."

Fruits

Most of the wild fruits, and berries of the peepul and neem trees are eaten raw, and usually when hard and green. Very few of them reach the women in their courtyards. Melons are eaten raw when ripe. When green they are cooked as vegetables. The local plantains are a small, inferior variety, and are preferred cooked, in combination

with vegetables. "Mahua" blossoms are eaten raw by the children. In case they are unusually plentiful, some are dried and cooked with vegetables later. "Bel" fruit and the wood-apple are usually roasted over a home fire until they burst. Pomegranates are rare. When they do appear, they are eaten raw. Guavas are eaten raw, usually when green. Wood-apples are also eaten raw. The sour fibre of tamarind pods is chewed by the children. Grown-ups soak the pods and make a sweet, cool, drink from the liquid.

Lemons are used in "achar"—pickle. The lemons are cut up, and ground spices are rubbed into the exposed inner surfaces. The spices used are cardamom, black pepper, fenugreek, and coriander. The lemons must remain covered with the spices for four or five days before being eaten. If prepared carefully, they will keep for a year. Plums are used to make a preserve. They are cooked, dried, and put into sugarcane juice.

Mangoes are the utility fruit of the village. They are eaten raw, cooked with vegetables, and made into a variety of pickles and preserves. An oil pickle is made by cutting the mango almost in half and removing the stone. Aniseed, red pepper, and salt are ground and added to the fruit, and oil is added to coat the surface. A salty pickle is prepared by cutting the mangoes into four sections and removing the stones. They are put into a clay jar and sprinkled well with salt. Another form of mango preserve is made with sugarcane juice. Green mangoes are soaked and dried, or ripe mangoes are used, without cooking. They are dropped into a jar of strained, fermenting sugarcane juice, and left there for months or years. They are not ready for use until after remaining in the juice two months. Mangoes may be peeled, split, and dried after the stones have been removed. In this form, they may be added to almost anything which lacks flavour. A mango preserve is made by peeling the mangoes and rubbing them to a pulp with the spice-stone and roller. Salt, pepper, coriander and peppermint are added. This "chatni" (chutney) spoils quickly.

Even the kernels of the stones removed from mangoes are used. The stones are split, the kernels taken out, boiled, dried and eaten. They may be roasted, if preferred.

Animal products

Milk and milk products are the chief forms of animal food in the village. Fresh milk is seldom used, unless there is an unusually large supply. When a cow first gives milk, the fresh milk is boiled, and clabbers almost immediately. This is eaten, with or without raw sugar. It is eaten during the next four or five days, as long as the milk is drunk after boiling. After this is made into "ghi". In most homes all of the milk is reserved for "ghi". The milk is heated slowly in a clay jar, over a nest of smouldering dung-cakes. A little buttermilk is added, and it is set aside all night. By morning it

has clabbered. At this stage it is called "dahi", and may be eaten with sugar. In city homes it is often served. But in the village, it seldom stops here, but goes on to butter.

The "dahi" is put into the churn, water is added, and it is churned. When butter forms, it is taken out and put into another jar. The butter is never used, but is collected for eight days. The sour buttermilk which remains in the churn has a variety of uses. The men of the family like it with their "satua"—parched, ground cereal—in the morning. It may be used with vegetables in "reota", described among vegetable dishes. Or it may be cooked with pulses in the dishes which we treat as meat substitutes. If there is not time to use it in any of these combinations, the men drink the buttermilk. Sometimes the children have a drink. The woman do not drink it.

The accumulated butter is heated in a deep kettle over the smouldering dung-cakes, or in the kettle for deep-fat frying over the fire-place. It may be heated from one-half to four hours, depending on the fire. Foreign matter which collects on the surface is skimmed off. When the heated butter is removed from the fire it is strained through a cloth. The clear fat which goes through is "ghi". It is regarded as the ideal medium in which to fry foods. Frying is an important process in village cooking, as it must be used for all foods served to guests and for food which members of the family must eat away from home, even though they eat it in their own fields. In the absence of ovens, many things are fried in "ghi" which we would bake. "Ghi" is also used in the preparation of a number of sweet-meats. In prosperous homes, it is an important ingredient in the special dishes given a woman two months before and a month after child birth.

The Brahmans of our village eat no meat. They do not take advantage of the opportunity offered them by the Sacred Law, of eating meat as sacrificial food. Manu provides that "He who eats meat, when he honours the gods and manes, commits no sin, whether he has bought it, or himself has killed (the animal) or has received it as a present from others." V. 31.

It may be that with the giving up of priestly duties, for farming, they have given up priestly privileges as well. If they were to eat meat, without sacrificial intention, they would be guilty of sin. "There is no greater sinner than that (man) who, though not worshipping the gods and manes, seeks to increase (the bulk of) his own flesh by the flesh of other (beings)." V. 52.

The attitude of our Brahmans and of the orthodox Hindus who try to follow them is expressed in the Law. "Meat can never be obtained without injury to living creatures, and injury to sentient beings is detrimental to (the attainment of) heavenly bliss; let him therefore shun (the use of) meat." V. 48....."Having well considered the (disgusting) origin of flesh and the cruelty of fettering

and slaying corporeal beings, let him entirely abstain from eating meat." V. 49.

It is this attitude which keeps meat out of sight in the village. The Hindus who eat it, do their buying in the Muhammadan quarters or in their own shadow stables, as quietly as the excitement of bartering allows. The goldsmiths show themselves unorthodox in many ways, one of which is meat-eating. They do not talk about it but every one knows that they eat flesh. One or two carpenter families eat meat, as well as several families below them in the caste scale. They all limit themselves to goat meat. The cow is revered too highly to be thought of as a source of food. Muhammadans eat as much goat meat as they can afford. Living in a Hindu community they have much the same attitude as their Hindu neighbours toward beef-eating.

Hindus and Muhammadans prepare meat in the same way. They cut it up into small pieces, sear it in fat, add water and spices and cook it. They eat it with rice or bread. Meat dishes were the only ones denied me by my little Hindu cooking-teacher. She warned me that she would never touch our experimental fire-place or utensils if I were to defile them with meat. She knew that we ate meat, but that was not her responsibility, as long as it was kept out of her field of activity.

Sweepers and Dhanuks, two castes of outcastes, are the only ones who will touch pork. After watching the scavenging activities of village swine one is not surprised that their flesh is repulsive to most villagers. Only those who are brought up with the consciousness that they are themselves unclean, could eat it. The men do the butchering and divide the pig into shares. The women cut it up still further, into small pieces which can be fried and spiced, and eaten with bread or rice. The head is the most desirable share.

Fish is not classed with meat. Many eat it who abhor meat. We were surprised at the number of castes represented on the banks of drying ponds, waiting to start their "basket-fishing." On the occasional fishing days in the spring, the whole village smells of frying fish. Only Brahmans and those others who pride themselves on keeping the letter of the Law, abstain.

Eggs are prohibited almost as much as pork. The fact that eggs hold potential life makes it impossible for orthodox Hindus to eat them. In so doing they would be destroying life. A further objection to the eggs is the objection to the chickens that lay them. Chickens are kept by outcastes. No one feeds them and they wander about the lanes near the outcaste section as scavengers. They are scrawny and offensive. The outcaste families who own them eat the few eggs which they lay.

E—FESTIVAL DISHES

Special dishes are reserved for days of religious festivals, and weddings. From the passing of one festival to the coming of the next

housewives and children, and often the men, recount the special dishes they have had or are going to have. A meal of toasted millet bread and stewed pulse tastes better if one thinks while eating, of sweet-meats fried in "ghi". The pleasure of anticipation is granted to all, as those with much share with their dependents on these occasions.

"Puris"—bread of finely ground wheat flour, fried in "ghi"—appear on all feast days. The other articles vary. "Holi" is the great festival of the spring. With its coming there appear "gojha", "yasse", "chandia", "puri", "kachauri" and "halwa". For "gojha", wheat flour is ground fine, sifted through a coarse cloth, kneaded and shaped into cakes as for bread. The cakes are dried for several hours, then fried in deep fat. When fried, they are pounded into small pieces and dried again. When well dried, they are ground in the stone flour mill, and put through the thread-strung sieve. The sifted material is combined with black pepper and crude sugar and again sifted. Rasins and "chiraunji" (small nuts) and cut up fresh cocoanut are then mixed with it. This is the filling. The crust is made of fine wheat flour, kneaded and rolled out as for small "puris". Each cake is flattened out in the hand and filled with the mixture. Then one side of the cake is folded over and the edges pressed together, very much like small turnovers. As rapidly as the turnovers are prepared they are fried in deep fat.

"Yasse" is made of rice. The rice is husked, soaked, and pounded fine. It is then beaten up with a little warm "ghi" or oil, and raw sugar is added while beating.

"Chandia" is made of split "urd." The "urd" is soaked and its husks removed. Then it is rubbed to a thick paste, together with asafoetida and salt. This paste is spread on a wet cloth in a small circle (about four inches in diameter). A hole is cut in the centre, and it is lifted from the cloth, fried in deep fat and then added to buttermilk. "Puri" and "kachauri" have been described under cereal foods.

"Halwa" is prepared by making "puris" and grinding them up as for "gojha". One pound of this is browned well in one pound of "ghi", and combined with one pound raw sugar. A little water may be added if necessary. It is like a stiff mush, patted out and cut into cubes. Rasins may be added. In town there are many variations of "halwa", such as adding grated carrot, nuts and cocoanut. But in the village, the simple form is adhered to.

In the spring, just before the last field of the winter crops is cut, the farmer's wife makes "sira". For this she browns wheat flour in "ghi". She melts raw sugar in a small quantity of water and adds hot water to it. Then she adds the browned flour and rasins and cocoanut and serves it.

The wedding season comes in May and June. Wedding parties go from our village to be entertained in other villages and wedding parties from other villages are feasted by us. There are "puris", "kachauris," "halwa", and fried vegetables and pulse dishes, all of which have been described. A special dish is called "tikian". It is made of gram flour, mixed with enough water to make a stiff dough. In a deep kettle, water is heated—about three quarts water to one pound flour. The stiff dough is made into little flat round cakes, a little larger than the palm of the hand. These cakes are dropped into the boiling water and boiled about twenty minutes, until tough. They are then lifted out and spread on a tray to cool. Each cake is cut in half, and then into cross-wise strips. The gram flour inside looks packed and uncooked. Salt, red pepper and turmeric are ground and mixed through the strips. The sticky surfaces hold the spices. Two ounces of "ghi" and a pinch of asafoetida are heated in the deep-fat frying kettle and the spiced strips are fried in it. When the strips are well browned, water is added almost to the top of the kettle. It is cooked until most of the water boils away, when salt, cloves, cardamom, and black pepper are added. It looks like noodles in thick brown gravy and tastes better than it looks.

Two festival dishes go through the same steps, but one is sweetened and one is made salty. The sweet cakes are "gul-gula" and the salty ones are "pakaori". To a pound of wheat flour a pound of melted raw sugar is added, also a small ginger root and a large cardamom. Water is added until the batter is like that for ginger bread. The frying kettle is half filled with "ghi" or oil, and heated. A handful of batter is dropped into the fat. The cakes thus dropped puff out and turn a rich brown. They are delicious, like doughnuts, with a strong molasses flavour. For the salty cakes, salt and asafoetida are added to the flour and the same procedure is followed as above. We prefer the salty cakes.

At wedding time mangoes are at their height, and appear in many forms. In addition to the preserves described, a special mango dish is prepared, called "Amiyan chinghora". Turmeric, pepper, salt and coriander are ground together. Oil is put into the frying kettle and the spices are heated in it. Gram flour and mangoes have previously been peeled and stoned. When it is ready to remove from the fire, heated asafoetida is stirred into it.

In August, during the rains, there is a festival which is a happy one for the girls. Most brides, and often women long-married, go to their fathers' homes for this festival, "Raksha Bandan". The dish most definitely associated with this festival is "samai". Every woman makes it. She makes a stiff dough of the finest wheat flour she can grind. She inverts a large clay jar, and on its bottom she rolls the dough into a long thin string like vermicelli. The dried branch of a tree is stood on a roped cot, and the vermicelli is draped

over it. When it is dry, the whole family enjoys it, mixing it with melted raw sugar.

In the Autumn comes the Feast of Lights which is another occasion worthy of feasts. Puffed rice, plain or sweetened is the special dish for this festival. And there is "lapasi". A thin sweetened flour batter is poured into hot fat and stirred until it is a smooth thick brown sauce. This is poured out on a tray where it becomes firm almost immediately. It is patted out and cut into squares for serving. "Lapasi" may be made of wheat, maize, or barley, and may be sweetened or salted.

Another dish associated with the Feast of Lights is "pitaua". Spiked millet or great millet is ground, and combined with raw sugar and sesame seeds. It is worked into a dough, and shaped piece by piece into round flat cakes, about six inches in diameter and three-eighths inches thick. These are fried. Maize may be used in place of the millet, in which case salt is added instead of sesame. "Halwa", described under the Spring Festival, also appears on the Feast of Lights.

At any time during the year which is proclaimed auspicious, a man may give what is called "Katha". He calls in a priest to read from the sacred books, and invites all relatives within reach to come and listen, and feast. By giving a "Katha", a man gains much merit. At the feast he serves the guests mango preserve, with "Channa mirt". "Channa mirt" is a mixture of cow's milk, leaves of the holy basil tree, Ganges water, sugar, curds, and gram. It is served in little clay cups, or poured into the hands of the guests. At the same time, two wheat flour dishes are served. One of these is simply wheat flour mixed with hot "ghi" and then with raw sugar. For the other, wheat flour is made into a stiff dough with water and melted raw sugar. The dough is shaped into a long slender roll from which small slices are cut and fried in deep fat.

Among the special dishes of the village must be included those prepared for women before and after their babies are born. One such dish is "mewa kilaurna", given to a woman during the early nursing period. Coconut, almonds, pistachies, rasins, dried dates, are all chopped together and heated in "ghi". Gum from the gum acacia tree is added. Raw sugar and water are boiled together until it forms a thread. It is stirred into the prepared condiments and the whole is beaten and shaped into balls. It resembles Persian sweets. This is only available in the better homes.

Another special food given a woman after child-birth is "harira". Aniseed, coriander, turmeric, fennel and "ajwain" (*caryota copticum*) are ground together. Equal weights of these and "ghi" are combined and added to their total weight of raw sugar. A little water is added. Both of these sweets are supposed to add strength, and increase the flow of milk.

IV—FOOD PRACTICES

Certain practices in regard to food have become customary in Karimpur. They are the product of the experiences of generations. Some of them are common to all Hindu communities, others are limited to the Ganges area and still others are found only in our district. There are two sets of these practices. One set is associated with the good, and the other with the harm which may come to a person through food. Both have the support of custom, but those associated with the good which food may do, are such a simple part of daily living that one is hardly aware of them. They encourage the distribution and use of foods shown by experience to be beneficial. Those practices associated with the harm which may come through food receive much more emphasis. They take the form of food taboos, supported by religious law and ceremony.

A—FOOD TABOOS

Blunt, in his discussion of the caste system of Northern India, lists seven kinds of food taboos. (10).

“The food taboos of Hindu life complicate it to an almost incredible degree : and as has many a time been pointed out, prevent ‘the growth of the good fellowship which we are wont to cement at the dinner table.’

“Hindu food taboos are of several kinds :

1. The commensal taboo—which lays down the persons in whose company a man may eat food.
2. The cooking taboo—which lays down the persons who may cook the food that a man eats.
3. The food taboo—which lays down what kinds of food a man may eat.
4. The eating taboo—which lays down proper ritual at a meal.
5. The drinking taboo—which lays down the persons from whom a man may take water.
6. The smoking taboo—which lays down the persons whose pipe a man may smoke, and in whose company he may smoke.
7. The vessels taboo—which lays down the nature of the vessels that a man may use for eating, drinking, and cooking.”

To a new-comer, these and related taboos seem an absurd waste of time. But as we observed the measures which we took to protect

(10) See References, page 121.

ourselves from disease in community with no sewers, no screens and no quarantine rules, we admired the skill with which high caste Hindus had formulated rules with all the prestige of ceremonialism, which served to protect them and their progeny from the dangers that apparently lurk in food. We tried to explain our reluctance to eat in village homes in terms of flies, and small-pox and cholera germs. But our village friends pleasantly ignored our terminology and explained for practices to each other in their own familiar terms of caste rules. They were relieved to find that although we mingled recklessly with all castes, we still maintained certain prohibitions. This discovery made us more comprehensible to them.

The Brahmans at the top of the caste scale, are meticulous in their observances of the religious law. This includes bodily cleanliness. Even our busy Brahman farmers try to bathe every day. A man stands beside a well and pours water, freshly drawn, over his body, while he repeats prayers. He wears his loin cloth while bathing and changes it for a dry one if he has it, after the ceremony is completed. After this bath he is ready to eat. No one is supposed to touch him until he has finished his food. Bose, in describing Hindu customs in Bengal, writes, "When Hindus sit together to eat, their seats are generally wooden planks or 'Kusa' grass seats placed on the floor. These seats must not touch one another and no Hindu will touch another person who is also eating by his side. Among Brahmins this rule is very strictly observed. No one except the mother and the wife can touch a Brahmin while he is eating; if he does, he will stop eating and get up and wash his hands and mouth. This is a most barbarous custom. Some Brahmins do not allow their wives to touch them while they are eating. As the mother is regarded as a goddess by all Hindus they make an exception always in her case." (11)

The Brahman wife, who serves her husband, has also bathed or at least washed her hands before preparing his food.

S. N. Jafri, Deputy Director of Public Information of the Government of India, gives an interesting picture of eating in a Hindu home of the United Provinces.

"The system of taking food by the Hindu tenantry, or for the matter of that all Hindus except those who are influenced by modernism, is unique.

"They sit in a part of the floor of the kitchen; which is called 'chauka' and is meant as a place for taking food. Before eating they take off all their clothes except the 'dhoties,' or the piece of cloth that goes round the waist and answers the place of trousers. In fact, other pieces are very seldom put on after bathing. The coat, the cap, and the turban, are all taken off, and a man eats with his body and head uncovered. Shoes

are of course left at the door of the house. To woollen stuffs, they believe, there attaches no ceremonial uncleanness and these they use while eating and worshipping, though they get them washed by bleachers, members of an inferior caste. In very cold weather, while eating, they generally throw a blanket over them.

"The plates containing the food are put on the 'chauka,' because placing the food anywhere else would pollute it and then it could not be eaten. All the food that is cooked is not placed in the 'chauka' at once, but only the requisite quantity. The woman of the family who is the principal cook at the time, or officiates in the kitchen, serves the food for the eater or eaters. She sits near the fireplace, where the 'chauka' is situated. The man squats, in which case he has a small smooth board under him; his knees stick up close to his chest, the joint of the left arm and hand rest upon the left knee and it is thus the hand is supported while stretched out.

"Both Hindus and Muslims eat with their fingers; knives and forks are unknown—the food is of such a kind that the fingers manage to carry it to the mouth. and thus they can eat very conveniently with one hand.

"A Hindu at the time of eating must not be touched by one of inferior caste or by a non-Hindu for, if he were, he would immediately rise and not take another mouthful, even if he had to go without food the whole day; he would also throw out that which he might have in his mouth. He would never eat food prepared by a non-Hindu or even a Hindu of an inferior caste; and to some the shadow of a low caste man falling on their victuals renders them unfit to eat. A Hindu's food is of two kinds, "kachcha khana" and "pakka khana." All the above-mentioned ceremonies are required for "kachcha khana." No ceremonial uncleanness attaches to dry things, such as flour and grain, and none also to fruits. Such things a man of higher caste can receive from a man of lower degree."(12)

Before one can attempt to understand the intricacies of the food "Thou shalt nots" of a Hindu community, he must know the distinction between "kachcha" and "pakka" food. Ghurye in his presentation of Caste and Race in India, gives one of the clearest statements of this distinction that I have found.

"Restrictions on feeding and social intercourse. There are minute rules as to what sort of food or drink can be accepted by a person and from what castes. But there is very great diversity in this matter. The practices in the matter of food and social intercourse divide India into two broad belt. Hindustan proper

(our section of India), castes can be divided into five group; first, the twice-born castes; second, those castes at whose hands the twice-born can take 'Pakka' food; third, those castes at whose hands the twice-born cannot accept any kind of food but may take water; fourth, castes that are not untouchable yet are such that water from them cannot be used by the twice-born; last come all those castes whose touch defiles not only the twice-born, but any orthodox Hindu. All food is divided into two classes, 'Kachcha' and 'Pakka,' the former being any food in the cooking of which water has been used, and the latter all food cooked in 'ghi' without the addition of water. As a rule a man will never eat 'Kachcha' food unless it is prepared by a fellow casteman, which in actual practice means a member of his own endogamous group, whether it be caste or sub-caste, or else by his Brahmin 'Guru' or spiritual guide. But in practice most castes seem to take no objection to 'Kachcha' food from a Brahmin. A Brahmin can accept 'Kachcha' food at the hands of no other caste; nay, some of them, like the Kanaujia Brahmins, are so punctilious about these restrictions that, as a proverb has it three Kanaujias require no less than thirteen hearths. As for the 'Pakka' food, it may be taken by a Brahmin at the hands of some of the castes only. A man of higher caste cannot accept 'Kachcha' food from one of the lower, though the latter may regale himself with similar food offered by a member of one of the castes accepted to be higher than his own." (13).

Blunt gives the explanation of the distinction between the two kinds of food.

"The Hindu draws a distinction between 'Kachcha' food, which is cooked in water, and 'Pakka' food, which is cooked with 'ghi' (clarified butter). This distinction depends on the principle that 'ghi' like all the products of the sacred cow, protects from impurity; and since such protection is the object of all food taboos, this convenient fiction enables the Hindu to be less particular in the case of 'pakka' than of 'kachcha' food, and to relax his restrictions accordingly." (14)

In our village "kachcha" food is an exclusive, family-only product. But on certain definitely fixed occasions a Hindu may eat "pakka" food, prepared by others than members of his own family. The persons who may cook this food are all listed in the rules of his particular caste. In this way, although he ventures to dine abroad he is still somewhat protected. The persons who may cook the feast of "pakka" food, which he shares must be his equals or superiors in the caste scale. This guarantees that they will be at least as clean as he is, if not cleaner, in the care of their bodies and their food. If he is a Brahman, he is

supposed to feast only at the house of a Brahman, with the understanding that the food has been prepared by members of the Brahman household, Brahman servants, or servants of watercarrier caste. He takes for granted that any sweets too elaborate to be prepared at home, have come from a *bona fide* "halwai," maker of sweets. If doubt arises about the source of any article of food, the Brahman guest does not hesitate to make pointed inquiries of his host about it, before touching it.

The following is just a short section from pages and pages of laws stating from whom a Brahman shall not accept food :

"The food of a king impairs his a Brahman's vigour, the food of a Sudra his excellence in sacred learning, the food of a goldsmith his longevity, that of a leather-cutter his fame. The food of an artisan destroys his offspring, that of a washerman his (bodily) strength." Code of Manu. IV. 218 and 219.

The Brahmans of Karimpur treat their goldsmith neighbours as being worthy of becoming their hosts on special occasions. At the lower end of the caste scale are the Sudras. They can eat "pakka" food or drink water from members of the long line of castes above them. But better than any other food for the Sudra is that which a Brahman has touched.

"Sudras who live according to the law, shall each month shave (their heads); their mode of purification (shall be) the same as that of Vaisyas, and their food the fragments of an Aryan's meal." Code of Manu. V. 140.

Below the Sudras are the outcastes. They haunt the weddings and other feasts of any caste, ready to hurry in ahead of the dogs and crows, to gather up the scraps left by guests on their leaf plates. These leftovers they carry home in baskets or ends of scarves or loin cloths. They eat what they can at the time, and dry out the rest to be eaten later. No one worries about protecting the outcaste from possible contamination.

Our years in India convinced us that experience had taught the law-makers well—at least for their own benefit—in the matter of "kachcha" and "pakka" food. We found ourselves unconsciously following their practice. We learned that we could safely go to a wedding feast in a village home, where we would hesitate to eat the daily food. This was because the wedding foods were all "pakka"—fried in hot "ghi" and served at once. It was not the sacred source of the "ghi" which influenced us, but the fact that it was sizzling hot.

The weighty distinction between "kachcha" and "pakka" food complicates food preparation for the village housewife. When her husband and sons eat in the family courtyard, everything may be

"kachcha." She makes the ordinary cereal cakes and toasts them, and she may cook "sag" (boiled green vegetables) or pulses. If one of the men wants his food sent to the fields where he is working, she must prepare "pakka" food for him. She cannot send boiled food to the fields, as it would be "kachcha," and "kachcha" food may not be eaten in the fields when there is a possibility that the food or the eater might be touched. So she must fry the vegetables, and she is supposed to fry the cereal cakes in deep fat. These fried cakes are made only of pure wheat flour, which she cannot afford to use often. Neither can she afford large amounts of "ghi" or oil for deep fat frying. So she toasts cakes of mixed flour in the usual way, and sprinkles a little "ghi" or oil over those which are to be carried to the worker in the fields, and pronounces them "pakka". Thus she keeps the law with a few drops of "ghi". But her problem does not end here. If she should prepare her "kachcha" food such as toasted cakes and pulse first, then any food which she prepares after it becomes "kachcha", even though it would seem to be "pakka," by being fried in "ghi". It can then be eaten only by members of the family within the courtyard. If she has "pakka" food to prepare she must finish it first, and set it aside in a prescribed place, and after that, cook the "kachcha" food. She finds it easier whenever possible, to have everything fried in "ghi"—"pakka", or everything "kachcha".

"Kachcha" food must be eaten immediately. If a woman discovers that she has prepared more of some "kachcha" food, such as boiled vegetables or pulse, than will be used at noon, she can mud plaster a corner near her fire and set some of the food there to be kept for the evening meal of the same day. But she must do this before any one has been served. If any "kachcha" food is left after a meal has been served, the women and children may eat it later on in the day or even the next morning. The men will not touch it. One appreciates this precaution after observing what might walk over food standing on the floor, even though it be in a special corner, where no human treads.

Drinking water is protected from contamination by a number of laws. Only three Brahman courtyards in Karimpur are large enough for wells. The other wells—19 in all—are along the lanes and paths. Each well may be used by certain families, and must not be touched by others. Brahman women and other women kept in seclusion cannot leave their courtyards. Women of water-carrier caste draw their water for them. Whoever uses the well lets his or her jar down into the water. This makes it important that unclean castes and strangers be prohibited from using a high caste well. We were not allowed to get our water from any of the village wells, as the boy who carried our water was a leather-worker, and the well of the leather-workers was too far away to be used. So our water came from an irrigation well in our grove and sometimes from one in the fields. We were not as particular

as our village friends about who shared our well. In place of caste prohibitions, we resorted to thorough boiling. When cholera broke out in the village one summer, the district sanitary department sent out men armed with potassium permanganate. They did not limit themselves to the wells used by contaminated households but treated all wells, for safety. Someone told our people that the permanganate was poison. As we went the rounds to re-assure them we found men laboriously trying to empty the wells of the red water, a jarful of water at a time. If the permanganate had been somehow related to ceremonial purification or if waterboiling could have been substituted and given some spirit-appeasing significance, it would have been accepted readily. But being introduced officiously, without explanation, it was upsetting.

Dishes in which food is prepared or served are carefully guarded. They are used for the immediate family only. Red clay dishes and clay cups without handles are used for guests and thrown away. They are never used a second time. This is as satisfactory as our rinsing with boiling water and it is much easier. At least so our young sons thought when we washed dishes after our own guests had departed. If clay dishes are too expensive, a host may serve his guests on plates of large leaves bound together with twigs.

At a feast, nothing is ever passed around. The host or his sons serve the men, and his womenfolk serve the women, after the men have finished. As a server moves from guest to guest he is careful not to touch anyone with his garments and he is still more careful not to touch his hands, or the big iron serving-spoon against the plate of a guest. This would render the spoon, himself, and the serving dish in his hand unclean.

Food dropped on the floor must not be eaten. The advantages of this are obvious, especially where the floors are the earth, and children and animals relieve themselves anywhere. The villager has his own explanation, expressed in an old saying, "If edibles at the time of eating drop down they are taken by the shadowy spirits and should not be picked up and eaten. If you do eat, you are sure to be possessed by the spirits who will harass you much." (15)

There are other food regulations, the burden of which rests on the women. These have to do with the ceremonies of food preparation. In the morning as soon as her grinding is finished, a woman plasters her little fireplace and the floor all around it with fresh clay. The plastered floor space extends about three feet out from the fireplace. The clay she uses is not ordinary clay. It is collected from the edge of a particular pond, by the children of the family if she is too high in caste to get it herself. She mixes the clay with a little water and a bit of cow-dung in her mixing bowl, and plasters it on the surface of the fireplace and floor with a rag kept for the purpose. When the

(15) See References, page 121

plastering has been done, the fireplace and the plastered area around it are "purified". No one must go near them. Even the children of the family know that they must not approach it. It was not until I had my own fireplace that I appreciated the importance of this. In the absence of a kitchen table, it is necessary to have some place where one can put eatables and utensils and know that they will not be walked over. My fireplace was under a tree in our grove, with children playing all around, and farmers stopping to add their advice to that of my instructor. And only once did anyone approach this sanctum. That one was a little toddler of washerman caste. My teacher rushed at the child in a fury, and a torrent of reminders of her unworthy birth. The child fled, and we had no lesson that day. The fireplace had to go through a fresh mud-plastering before it could be used again.

While the fireplace is drying, a woman may perform any of the tasks which do not demand strict purity. She may churn or make her fuel cakes of dung or chop vegetables. When everything is collected for the meal—flour, water, pulse or vegetable, and utensils and spices—she bathes. This she does by standing in a sunny part of the courtyard and pouring water over herself and her clothes. Then she changes to a "dhoti", a scant garment made of one piece of cloth draped around the body and over the head. She never allows the village washerman to touch this garment, but rinses it out at home herself. The washerman's touch would indirectly defile her, and the food she touches. Women lower than the goldsmiths in caste, let handwashing take the place of the bathing ceremony.

When bathed, or washed, the woman enters the plastered area, by her fireplace, taking all of her materials and utensils with her. From this moment until after the men have been served, she must not leave it. The other women help with the preliminaries, but only the one who is ceremonially and physically clean, may attend to the final cooking. She alone may serve the men their food as they come and sit near her. In Karimpur the family never eats together, and even the men seldom eat together. Each one comes in when he is free, eats his meal in silence, and leaves the courtyard at once. The cook must wait until every man has been served before she is allowed to leave her post. Thus does a woman do her share in protecting the food which she gives her menfolk. For her own food, there are many less rules. She and the other women eat what the men leave. While they eat they are free to sit anywhere within the courtyard. Women are of little importance in the village interpretation of the Hindu code.

B—NUTRITION PRACTICES

The second set of food practices, mentioned at the beginning of this chapter, are much less formal and less obvious than the ones just discussed. They have arisen from experience which has demonstrated

the good effects which apparently result from the eating of certain foods. Most of these practices are simply an expression of physical desire for certain foods. I have called them "nutrition practices," as they express the village way of meeting body needs.

First there is the custom of sharing raw products. If there were barbed wire fences around orchards and fields our poorer families would suffer. As it is, each family of low caste with low food supply is dependant upon, and attached by custom to one or more high caste, prosperous families whom they call their patrons. When leguminous plants and mustard plants are young and their tops are tender, children of poor homes are allowed to pick them in the fields of their patrons. They gather enough so that their families have what they want to eat fresh, with some left over to dry and store for later use. The children also go into the fields of patrons and dig up certain of the green leaves which grow without tending, close to the ground. There are a number of those listed in the food table (p. 78).

With a diet based on cereals and legumes, supplemented with vegetables which are chiefly of the pumpkin and tuber varieties, village-folk need the minerals and the vitamins which these green leaves offer. And nature and custom have combined to make the leaves available, not just to the prosperous but to all.

The same is true of sugarcane. From the time it is ripe until it is cut and pressed, one sees children and men of all castes sucking and chewing at the stalks. In so doing they are supplying their bodies with the calcium of which they get little in their low-milk diet. In the cane juice there are also the calories which they need.

At harvest time sharing reaches its high point. Every man and boy in the village has a chance to work in the harvest fields. He may be a carpenter, a potter, or a leather-worker the rest of the year, but at this time he turns farm-hand. The untouchables are the only men excluded. We asked why? One of the farmers explained, "When they work just a little while, they perspire and then they complain because they are tired." We thought at first that this was an excuse for keeping the untouchables out of the fields. One expects to have real reasons veiled. But after seeing the untouchables at lighter field work, and their quick tiring, we agreed that the farmer had expressed his actual thought. A Multan proverb says, "He that eats a 'ser' (from 2 to 3 pounds) works like a lion, but he that eats only a quarter of a 'ser' works like wood-ashes." And we wondered if this might not help explain the seeming laziness of the untouchables who have no fields of their own and who get only a meagre share from others.

The men of all castes above the untouchables, and some of the low caste women, work daily while the harvest lasts. And every night each one carries home a headload of grain from the field just cut.

This gives them varieties of grain and pulse which they would not otherwise have.

At harvest time, women who cannot work all day, follow the harvesters, gleaning. A woman may glean in any of the fields belonging to her husband's patrons. In a few hours she can gather up several pounds of heads of grain—grain which would otherwise feed the crows.

At harvest time representatives of families of craftsmen and serving castes appear at the fields of patrons at the proper time, to claim their shares. Even the outcastes have rights at this time. No questions are asked. Everyone knows whose duty it is to give, and whose right it is to receive, and the proper amount. The ethics of this system of payment may be questioned, but it assures the low caste and outcaste families of a variety of cereals and pulses which they would not otherwise get, either from their own fields or from the bazaar.

In the fruit crops, we find a high degree of sharing. As has been noted, mangoes may be gathered by any member of the village, in any grove of the village. And mangoes are apparently their chief source of Vitamin C. The tamarind pods are available to all. And long ago Sanskrit medicine found in the tamarind, a quality now recognized as anti-scorbutic.

The children are the ones who let their physical needs direct their foraging. None of the edible fruits miss them. The wild ones which they eat, we know little about. But we feel sure that they must supply some Vitamin C, and calories, and perhaps some of the iron which they need. The gum from the gum acacia tree of which they are particularly fond, must add calories, if nothing more. We tried most of the strange fruits which they brought us to sample. A few were delicious, but we would not recommend many of them for flavour. The only offering which we absolutely declined was something which they scraped from the trees of our grove. It was apparently the deposit of mud made by white ants to serve as their passageway up the side of the tree. What the children got from it which was satisfying, I cannot imagine.

When the outcastes butcher a pig they treat the head as the choicest portion. It reminds us of the boar's head, praised by our own forefathers. The outcastes have not been told why the pig's head appeals to them especially. They only know that they like it. Here, as with the children and the fruits, nature guides them.

The people of Karimpur have learned to save and eat many things which we, with our plenty, have wasted. It is comparatively recently that we have been taught that the water in which potatoes and certain other vegetables have been boiled is valuable. We try to save some of the water for soups. In Karimpur the water which is added to vegetables is so small in quantity that little or none remain when the

vegetable is cooked. What does remain is eaten along with the vegetable. My village friends were horrified when they heard that in some places this water is thrown away.

They hate to throw anything away. When they cook vegetables, they never remove the skins, unless too tough for chewing. When their grain is threshed some of the finer husks remain. These come loose during the grinding of the grain into flour and are separated in the sifting. But the women are careful not to lose them. They put some back into the flour and save the rest to be mixed in with other flour which has less roughage. When I tell them that in America we separate bran, and sell it in packages apart from the flour, at a price which seems fabulous to them, they think that we must be very stupid, or at least shockingly extravagant.

When a woman prepares a batter of any of the buttermilk or pulse mixtures in her mixing basin she does the stirring with her right hand, and scrapes the basin clean with the same hand. But she is not satisfied with this. She pours water into the mixing basin, washes the basin and her hand and pours the washed product into the frying pan or jar or other container along with the original preparation. As nothing is measured exactly, this additional liquid makes little difference. And the cook prefers to have it in the soup, rather than in her open mud drain which is already messy and alive with flies.

As I walk through the village lanes on a festival day, I meet the women of serving castes, and outcaste women, going from door to door among their patrons. At each door they stand until one of the women of the patron's household tosses out several "puris" and the particular cakes or sweets associated with the occasion. If the serving woman thinks that she has not received her due, she says so, and stands talking about it until the women of the house give her something more, to get rid of her. If they think that she wants more than she should have, they shout at her until she is convinced that waiting will not profit her, and leaves. This sort of tumult alarmed me, until I learned that it was a perfectly friendly way of settling the amount of payment due. A definite payment in cash would seem more satisfactory to us. But cash, in the village is not as useful as food, especially the kind of food which is distributed on festival days. In the homes from which these low caste and outcaste women come, there is no wheat except that distributed at harvest time. They own no cows or buffaloes, and therefore have no "ghi". Meanwhile, there is plenty of wheat and "ghi" in the prosperous homes. And this method of handing them out in the form of festival cakes, assures the donors of religious merit, while giving the recipients and their children something which their bodies need.

There are sometimes other rare things used, to fill the cakes, such as cocoanut and dried dates. These help still further to meet neglected

needs. It seems like an unpleasant welfare method to us. But both parties regard it as an exciting and profitable procedure. Life would be dull without the anticipation of festivals. And as yet the West has not discovered a method of caring for the unfed, successful enough to be offered as an improvement.

Among villagefolk there is a conviction that certain foods have special qualities. Some foods are "heating", while others are "cooling." We noticed that patients almost always asked what food they should eat. Knowing little about their foods, we hesitated to advise. But there was always someone around ready to speak with authority. If the patient suffered from toothache or earache, or a cold, the term "heating food" almost always occurred somewhere in the lengthy advice. If the patient had fever, "cooling food" always occurred. The reasons also seemed important. In cold weather when a person had digestive difficulties, "heating foods" were advised. In similar cases in hot weather, "cooling foods" were recommended. We collected a list of the foods which we heard mentioned in these two classes. "Cooling foods" include: buttermilk; sugarcane juice; bread of barley flour; tips of gram plants; "raskhir," a combination of rice and sugarcane juice; radishes; carrots; Egyptian arum, or dasheen; and water-chestnuts. "Heating foods" include: bread of spiked millet; "dal" of pigeon pea; raw sugar; milk potatoes; corn and sesamum oil. As I recall some of these foods, in the setting of an Indian hot season, I have reactions towards them, similar to those suggested by the villagers. But I have no adequate explanations of them as two distinct classes. There is no one quality running through either class which might explain its designation. Further analysis of Indian foods may disclose a reason. At present, I simply offer the lists as demonstrating the effort of village folk to express the possible effects of food.

Another class of foods accepted in the village is that of "strengthening" foods. These are supposed to give superior strength to the already strong, or to restore strength to the weak. The goldsmith brothers who act as village wrestlers, and are the acknowledged "strong men", eat almonds and pistachies, both of which are luxuries from the Mainpuri bazaar. While in training, they give up meat, and add milk to their usual diet.

Strength-giving foods are considered important for expectant and nursing mothers. Two dishes reserved for them, "mewa kilaurna" and "Harira", are described in the section on festival dishes. These are too expensive for most homes, where simpler festival dishes of wheat or gram flour, rich in "ghi" and raw sugar, are substituted. Cocoanut and "phaphola" (nymphoea lotus) are included if possible, even though they must be begged.

For anyone who has become very weak, without particular reason, mixtures like the two following are recommended by the local, practi-

tioners. Three drams of roots of the okra, and twelve black pepper corns, ground together. This is one dose. Or, one green seed pod of the gum acacia tree and ten black pepper corns. Grind and make into sherbet, with one cup of water. Sweeten to taste. Drink this every morning until strength returns.

Sunshine is an acknowledged blessing in the village. Every morning good Brahman farmers chant hymns in its praise. We agreed with them, that but for the sunshine we would all have died. On several occasions, we found boys with smallpox scabs still peeling, riding with others on our boy's wagon or tricycle. We washed the playthings with disinfectant immediately. But we had to trust to the sun to save us from the germs which had had time to attach themselves before the discovery was made.

In the rainy season one appreciates the sun, by its absence. After a few days of heavy clouds and rain, the village lanes are like pools, fed by the streams which trickle from open house-drains and privies. The smells which rise up to greet one are nauseating. A few days of bright sunshine clear the pathway and atmosphere. The streams still trickle but they dry up before they become objectionable.

In this discussion, however, we are more interested in the sun's light as a source, or producer of, Vitamin D. As far as we know, it is the villager's sole source of Vitamin D, except for a small amount which he may get from green leaves. I have heard Westerners inquire, "If sunshine is beneficial, then why aren't Indian children large and stronger than they are?". This is demanding too much of sunshine. It cannot be expected to correct all diet defects. I have heard American doctors reply, that in rural India sunlight does well the work which they look to it to do. If our village children depended upon diet alone for adequate supplies of calcium and phosphorus, and for proper mobilization of the supplies, cases of rickets would be much more general and extreme than they are. I have found no definite records, beyond that of the work of Dr. Hutchinson and Dr. Shah. "A recent study of rickets in India by Hutchinson and Shah is clearly illustrative of the preventive role of sunlight. Surely there should be no rickets in India. Yet the infants of the top caste Hindus almost always develop extremely severe rickets. Owing to the religious custom of 'purdah,' which compels their mothers to live beyond the public gaze, these infants are practically never taken out of dusky rooms. In contrast the infants of Hindu labourers who cannot afford to expensive a religious detail practically never develop rickets. The women work with the men in the fields and leave their infants along-side in the sunlight. The rickets preventive action of sunlight is here particularly clear cut, since in both instances the dietaries of the mothers almost entirely lack the food-stuffs which contain the substance D." (16).

In Karimpur, custom co-operates with nature, in supplying sunshine to all castes. The women live and work in roofless courts. A few of these courtyard admit little sun in the winter months, but even they are better than stuffy rooms. Babies of all castes creep around naked during nine months of the year, and during the remaining three months they wear abbreviated cotton skirts. The children work in the fields or play in the lanes in scanty clothes which grow scantier with increasing heat. No one wears stockings, and few wear shoes. Craftsmen, instead of working in shops or work-rooms, carry on their crafts in village lanes or in open courtyards. The washerman, assisted by his whole family works beside a pond near our grove, not in a dark basement. Every one lives in the sunlight. And the sunshine blesses them. We have no cases of severe rickets in the village.

Some of the attitudes of our people toward food are expressed graphically in sayings and proverbs. These are an expression of their experience with food. Some of them are revealing enough to be included in this study of their practices. The rhythm of the lines is lost in translation.

"Juar (great millet) is my mother and makes my cheeks swell like raised sweet-cakes. Bajra (spiked millet) is my brother and restores my wasted form."

"Whoever eats 'mung' pulse daily, become flatulent and drowsy."

"Don't call me 'arhar' (pigeon pea). My name is dear maiden, When all other grains are gone you come fumbling after me. Don't call me 'arhar'! My name is dear maiden. Two cakes of me are as filling as sixteen of other grains."

"Arhar with dried mango and an ounce of 'ghi' makes a dish for the king."

"Rice is good, but split peas are my life."

"Everything is false in the world, save pulse and bread."

"Eat bitter melons in September, radishes in August, and raw sugar in April—this is the way to spend your money and buy illness."

"Two things agree with a man—his own wife, and plain toasted cakes and pulse."

"Two things bring pain—'puris' (cakes fried in deep fat) and strange women."

V—VALUE OF FOODS NOW IN USE

The scientific study of food in India seems to have originated in the planning of diets for prisoners. In 1880, Surgeon-Major T. R. Lewis in his annual report points out a phase of the vegetarian diet of our people, which more recent students of nutrition have emphasized:

"That chemical analysis, however exhaustive, can only afford such information as will enable a proximate estimation to be formed of the nutritive value of any food seeing that it is not only what nutriment a particular food-stuff contains that is of moment, but also what portion of it can readily be digested and assimilated by the body. In a diet composed entirely of vegetable substances, the quality of the cooking is of much more importance than it is in animal food dietaries, seeing that a large proportion of nutriment contained in cereals and pulses is enclosed in extremely resistant, indigestible envelopes, which if not effectually disposed of by proper cooking defeat all attempts on the part of the digestive organs to profit by the food..... In some cases, however, the excess of nitrogenous elements is given in the form of parched, or otherwise imperfectly cooked grain, so that it is probable that a large proportion of the contained nutriment will not be assimilated. On several grounds, therefore the addition of undue proportion of pulses—and especially ill-cooked pulses—is a doubtful advantage, and may be even injurious." (17).

The most outstanding contributions in the study of jail dietaries were those made by Major D. McCay, of the Medical College, Calcutta. His first investigations were in Bengal, but it is his investigations into the jail dietaries of the United Provinces in which we are particularly interested. His statement of the jail dietaries in use in 1910 is useful in a consideration of diets of North India.

"The diet scales for adult native prisoners on hard labour consist of 1 lb. 12 oz. of a cereal pulse combination, 2 oz. of 'dal', 6 oz. of vegetables with salt, a little oil and chilli. The cereal pulse combination is invariably made up according to the subjoined table:

Combination diet	Principal		Adjuvant		Total
	Grain	Quantity	Grain	Quantity	
A ..	Wheat ..	1 lb. 6 oz. ..	Barley ..	6 oz.	28 oz.
B ..	Spiked millet ..	1 lb. 8 oz. ..	Pulse ..	4 oz.	28 oz.
C ..	Maize ..	1 lb. 8 oz. ..	Pulse ..	4 oz.	28 oz.
D ..	Millet ..	1 lb. 7 oz. ..	Pulse ..	5 oz.	28 oz.
E ..	Wheat ..	1 lb. 7 oz. ..	Gram ..	5 oz.	28 oz.
F ..	Great millet ..	1 lb. 6 oz. ..	Pulse ..	6 oz.	28 oz.
G ..	Barley ..	1 lb. 6 oz. ..	Wheat ..	6 oz.	28 oz.
H ..	Rice ..	1 lb. 4½ oz. ..	Wheat ..	7½ oz.	28 oz.

(17) See References, page 121.

"Any two of the above may be combined by taking half of each principal and half of each adjuvant; thus $\frac{B+C}{2}$ will give $\frac{A+C}{2}$ spiked millet 12 oz. + maize 12 oz. + pulse 4 oz. = 28, or $\frac{A+C}{2}$ will give wheat 11 oz. + barley 14 oz. + pulse 3 oz. = 28.

"These are the official diet scales as sanctioned in the Jail Code, but in practice they are to a large extent ignored. The only diet commonly in use is Diet E of the above table; in fact it is the only one given in the majority of the jails all over the Province. During the cold weather months great millet, spiked millet, and barley are sometimes made use of, but hardly ever in the quantities laid down. The different superintendents give their own combinations of these food-stuffs with wheat and pulse, which are usually very different from the diets officially sanctioned.

"Rice has been very rarely used in the United Provinces. As it is only grown to a limited extent, the price is prohibitive. It was, however some years ago used in two district jails, close to the borders of Bengal, but an outbreak of Beri-Beri in both of these caused it to be discontinued and its use has never been revived.

" 'Marua' (millet) is never given at all; in fact, we failed to obtain samples even for analysis from the different jails, where investigations were carried out.

"Maize is seldom, if ever used : why this is so we do not understand as it is a very nutritious food-material and certainly superior to some of those in use.

"The pulses made use of in the United Provinces are principally 'arhar dal' (pigeon pea) and 'ur'd dal.' It would appear from the above table gram 'dal' is not classed as a pulse, but this is mistake as gram 'dal' belongs to the pulses.

"For at least nine months in the year Diet E, i.e.—

Wheat	..	..	..	..	1 lb. 7 oz.
Gram	..	..	..	..	5 oz.
Arhar dal (pigeon pea)	..	..	..	..	2 oz.
Vegetables	..	..	..	..	3 oz.
Salt	..	..	..	..	150 grains.
Oil	..	..	..	..	9.08 grams.
Condiments	..	..	..	..	2 oz.

is given to the exclusion of all others." (18)

The diet now in use in our Manipuri District Jail is practically what McCay recommended as a result of his investigations.

In jail, the prisoners have a cereal, a pulse, and a vegetable daily. Our village people are glad if they can have a pulse or a vegetable with

(18) See References, page 121.

their cereal bread. They rarely have both on the same day. And sometimes they have neither, and eat salt with their bread. But the villager spends his time in the fields where he may snip off the green tips of plants or roast a handful of grain. The prisoner's fare is exactly that which is recorded. The farmer's is very likely not exactly what we have recorded.

o McSay has some interesting comments on the contents of jail diets as compared with diets of the province outside the jail.

"We may, therefore, conclude this consideration of the pulses of these diet scales, by stating that they are present in quantities much in excess of what is required, and in far greater abundance than the people of the Province can afford, or wish to have. Two and a half chittacks or five ounces is the maximum amount of pulse that should enter into any diet, and, if gram is to be given it should be properly cooked, not made use of as parched gram, and it should never be the only pulse in the composition of the diet. The superiority of 'arhar dal' (pigeon pea) and the fact that it is the favourite form of pulse with natives of the United Provinces should ensure that this pulse will be used in all diets to as great an extent as possible. 'Urd dal' being more suitable than other forms in the preparation of 'bajra' (spiked millet) and 'juar' (great millet) for consumption, this "dal" should be used in diets into the composition of which those cereals enter. One chittack (2 ounces) of 'urd dal' will be found amply sufficient in the cooking of the quantities of 'juar' or 'bajra' recommended in new dietaries." (19).

(19) See References, page 121.

Diet used in the Mainpuri Jail, 1928

—	Bread	Dal (split pulse)		Parched gram	Rice instead of ata	Vegetables	Mustard oil	Salt	Chilies	Turmeric	Dried mango
		With bread	With rice								
Labouring ..	24 oz.*	2 oz. †	4 oz.	4 oz.	16 oz. (48 oz. if cooked).	8 oz.	8 gr.	9 gr.	1 gr.	1 gr.	70 gr.
Non-labouring ..	20 oz. †	2 oz. †	4 oz.	None	12 oz. (36 oz. cooked.)	8 oz.	8 gr.	9 gr.	1 gr.	1 gr.	70 gr.

*November to March, 16 oz. spiked millet, 8 oz. wheat—daily.
April to November, 16 oz. wheat, 8 oz. gram—daily.

†November to March, 13½ oz. millet 6½ oz. wheat—daily.
April to November, 13½ oz. wheat, 6½ oz. gram—daily.

‡November to March—5 days: 2 oz. arhar (pigeon pea).
2 days : 2 oz. mung or urd.

April to November—7 days : 2 oz. arhar (pigeon pea).

"Diet C in which the principal is 'makka' or maize, we have not investigated. It is never used, so far as we could gather, in the dietaries of the prisoners. Maize we found in Bengal was a very good food-material although not very palatable as prepared in Bengal Jails. It is not suitable alone for baking into bread or 'chapatti,' but is very good when mixed with wheat or prepared as porridge. We do not think it suitable as a principal, as in Diet C, but see no reason why maize should not be given as a substitute for part of the wheat in dietaries. Why it should never be given in the jails of the United Provinces is difficult to understand, as, next to wheat, maize is the best cereal on the list. It is used during its season fairly largely by the inhabitants of the province, and the average crop being up to one million tons, there cannot be any great scarcity of this food to enhance its price. We are strongly of the opinion that maize has been neglected unjustly, and that, if given as we suggest, mixed with wheat, it would be found quite satisfactory." (20)

"Judging from inquiries we have made, wheat is the food of the higher and middle classes and a luxury to the poorer. In times of scarcity or famine, when wheat, gram and 'juar' are practically the same price, wheat is eaten largely by the people, but in ordinary times 'bajra' and 'juar' are the principal food-materials of the poorer classes and small cultivator.

"Makka or maize is also largely used as a food-material, barley and 'marua' not to so great an extent as the other cereals. 'Arhar dal' is the favourite form of pulse, and a small amount is partaken of daily.

"It is, therefore, only right and fair to the prisoners that these secondary food-materials, 'bajra,' 'juar,' 'makka,' barley and 'marua,' should not be denied them. While they are not suitable to be used alone, when given along with wheat, in the manner we have indicated in the diets suggested, they are exceedingly useful in varying the monotony of the wheat diet, and in providing food-materials to which the great mass of the prisoners are accustomed." (21)

". . . from a physiological point of view it must be admitted that the dietaries at present in force, or any framed in future to maintain the same level are distinctly superior to those available for the great mass of the population, and that this will tend to place a premium on crime in periods of scarcity. This, however, is a problem with which we have no concern; we simply point out its bearing in passing and leave the present policy of the maintenance of the superiority of jail dietaries, over those possible

to the same classes outside the walls of the jails, to be determined by the government of the country." (22)

We hope that our people will find an adequate diet without being obliged to go to jail to find it.

McCay's investigations led him to the conclusion that the protein factor determines the place of Indian races in the scale of physical efficiency. He traced all differences in physique to the different levels of nitrogenous interchange possible in the diet of wheat-eaters and the diet of rice-eaters. If he had made his investigations a few years later he would have modified his conclusions to include minerals and vitamins.

Since the studies of McCay, there has been an increasing interest in the study of foods in India as elsewhere. But very little scientific work has been done. Colonel R. McCarrison has contributed more than anyone else through his experiments and through his efforts to use the results of his experiments in educating Indians in the possibilities of indigenous foods. He was a member of the Indian Medical Service until 1919 when he became Director of the Deficiency Diseases Inquiry, in the Pasteur Institute, Coonoor.

One experiment which he carried on with two colonies of rats (20 in each colony) contrasted what he calls a "good diet" with a "bad diet." "One colony received 'a good diet,' designed to resemble that eaten by the Sikhs. It consisted of "chapatties" made of whole wheat flour; uncooked, green vegetables, fresh fruits (tomatoes, etc.); sprouted gram (legumes); butter; fresh whole milk; and fresh meat occasionally." (23) Liberal quantities of each article were supplied so that the animals could select for themselves the amounts of each they cared to eat.

This diet is of interest to us, because all of the foods in it are available in our part of the country. Our village folk grow wheat, but they sell much of it. They do not grow as many green vegetables as they might, but at the same time they make use of every edible leaf within reach. They have plenty of gram, but they are accustomed to parching or cooking it. It would be easy for them to sprout it. They could grow tomatoes and oranges and lemons. Prejudice keeps them from growing tomatoes, and they have not tried growing citrus fruits, other than a few lime trees. Oranges are now grown in our area of the Province, and can be grown in Karimpur. They would be in season during the months when there are no mangoes. The village folk might have butter, but they clarify it all to make "ghi." The same is true of milk. There is milk in almost every home and some families drink it. But in most households the milk is heated and churned to be made into "ghi." As for meat, a few eat it now. The meat at present sold is very inferior, coming from old, decrepit or diseased animals. It is a poor recommendation, for meat-eating.

(22), (23) See References, page 121.

Colonel McCarrison's "poor diet" consisted of foods eaten by any Western people of the poorer classes—white bread, cooked vegetables, a cocoanut oil margarine, canned meat and jam, with preservatives, and tea, with milk and sugar.

The experiment lasted six months, during which time all of the rats were given equally good care. They all had a two-hour sun bath daily. During the six months, three rats out of the 20 on the "good diet" died, one of them from injury. Nine of the 20 rats on the "poor diet" died. Three of these were killed and eaten by their fellows. After this, the rats of the ill-fed colony were separated every night and a small quantity of fresh vegetables was given three times a week. The other six died from broncho-pneumonia. There were 20 litters of rats born in the well-fed colony, and all of the 134 born were reared to maturity. In the ill-fed colony, two litters were born, one of seven and one of four rats. Two of these eleven died and the others were eaten before they could be removed.

The aggregate body weight in each colony was 2,540 grams at the start. At the end of the experiment, the aggregate weight of the "well-fed" colony (17 rats) was 3,170 grams, whereas that of the eleven survivors of the ill-fed colony was 1,300 grams.

Colonel McCarrison's conclusions are :

"Not only does the former (good diet) promote physical efficiency and health but the latter (poor diet) gives rise to stunting of growth, to physical inefficiency, and often-times to disease. The maladies of which the bad diet is so apt to lay the foundation are lung diseases and gastro-intestinal disease." (24)

This last statement is based on his post mortem examinations.

Our people have the symptoms of the bad diet, while the good diet is within their reach. Experience has taught them much. But Science can add what experience has evidently missed. Few of them can read and those few see no newspapers or journals. The contributions of Science have no way of reaching them as yet. With its help they will be enabled to build up stronger bodies, without the need of importing new foods. With the raw materials already available, they have a better selection of foods than people in the West who are not as poor as they.

An article by Colonel McCarrison which appeared in "The Practitioner" on "The Relation of Diet to the Physical Efficiency of Indian Races" (25) is of value in our study. It is worth quoting at length.

"Few who have travelled far in India can have failed to notice the remarkable differences in physical efficiency of different Indian races. So great is the contrast between certain stalwart, vigorous,

(24), (25) See References, page 121,

and resolute people of the North and certain poorly developed and toneless inhabitants of the South and East, that the question arises: Why should there be these great differences between one race and another? In attempting to answer it, I shall put aside such factors as climate, prolonged exposure to the actinic rays of the sun, peculiar religious customs and endemic diseases. For while it cannot be doubted that these play their part in determining the position of different Indian races in the scale of physical efficiency diet is the most important of the factors concerned. . . .

"The food materials available to the people of India. . . are mostly derived from the vegetable kingdom. They include rice, wheat, barley, maize, millet, legumes, vegetables and fruit. For various reasons—of which locality, poverty, religious scruples and habits are the chief—milk and milk products, eggs, and flesh meat enter little, if at all, into the diet of great masses of the people. The use of these commodities is confined, as a general rule, to the better classes and to certain races in Rajputana, the Punjab, Northern India, and the West Coast. The staple food of the masses thus consists of 'those parts of plants which have the function of storage tissues' (McCollum), viz., cereals and legumes. 'These are deficient in at least three dietary factors. All contain protein of relatively poor quality; all contain too little of certain mineral elements, especially calcium, sodium, and chlorine and all are deficient in fat-soluble vitamin A. It is true that the diet is supplemented with vegetables and fruits, but these are not eaten in sufficient quantity to compensate for the defects of the cereals and legumes. For these reasons the diet of many millions of people in India is an incomplete one which 'does not contain all the complexes necessary for the construction of living protoplasm' (McCollum). Now it is, to a large extent, in proportion to the way in which the defects of what may be called 'the basal diet' of the people of India are made good by the use of other foods containing more suitable protein, more of the essential mineral elements, and more vitamins, that the physical development and well-being of the different races of India depend.

"The least satisfactory of all the diets in common use in India is that consisting of rice, 'dal' (legumes), vegetables and condiments. This diet is used by millions of people in Bengal, Madras, and elsewhere; and it is these who exhibit the lowest grade of physical efficiency and health."

We need not follow in detail, as it does not apply to our section of the country.

"If now it be found that the diet of other races is such as corrects some or all of the five faults pertaining to the diet of rice and legumes, then, other things being equal, the better diet ought to be associated with a higher grade of physical efficiency.

in the races using it; this is precisely what we find. For when we pass from the rice and legume eaters of Lower Bengal to the wheat and legume eaters of the United Provinces—climate and other factors being practically the same in both localities—we see that the latter are “better developed physically, more capable of hard work, harder and more alive than the average resident of Bengal of the same class” (McCay). The reasons for this are that wheat provides a protein of better quality than rice; the composition of the diet admits of the absorption of a larger amount of protein, of the attainment in short of a higher level of nitrogenous interchange (McCay); there is not the same ingestion of carbohydrates nor the same tendency to gastro-intestinal disturbance; the deficiency of mineral elements is not so great, and the diet is, in general, richer in vitamin B. It is, however, faulty in regard to the quality of its protein and to its content of mineral essentials and of vitamin A; and since its users do not, as a general rule, supplement it with a sufficiency of other foods, rich in those elements and complexes in which it is poor, they lag behind, in physical development and well-being those races that do.”

This describes the people of Karimpur. They are better developed than those of the south, but they have not reached the degree of physical efficiency attained by the races further north, whom McCarrison proceeds to describe.

“The high degree of physical efficiency of the Sikhs is attained on a diet of wholemeal bread, legume seeds, tubers and roots, vegetables and clarified butter, supplemented with liberal amounts of cow’s, buffalo’s or goat’s milk (whole milk, buttermilk and curds). Beef is never eaten by them, but goat’s flesh, mutton and game are eaten occasionally, although not in large quantities. In Sikh regiments, for instance, a pound of meat is eaten by each man two or three times a month, while 16 ounces of milk are taken daily. In their own homes much larger quantities of milk are used than is possible in regimental life. It is to be noted that milk and milk products are constant constituents of their food, other animal foods being regarded more as a luxury than as a necessity. Their children are breast-fed for two and a half years, the mother’s milk being supplemented with diluted cow’s or buffalo’s or goat’s milk during the later months of lactation; thereafter they are given liberal amounts of milk and are gradually brought on to the diet in use by their elders. The Sikhs use vegetables freely, but they do not eat fruit to the same extent as certain hill people whose climate is more suited to its cultivation.

“The food of the Pathans is much the same as the Sikhs, but they eat more meat and less legumes. They have the advantage of a better climate and more fruit and nuts are available for their use—mulberries, walnuts, etc.

"The people of Hunza make less use of meat than either the Sikhs or the Pathans. Their food is much the same as that of the Sikhs but less rich in milk, their stock being confined to goats. They are, however, great fruit-eaters, especially of apricots and mulberries. They use apricots and mulberries in both the fresh and dry state, drying sufficient of their rich harvest of them for use throughout the autumn and winter months. Dried mulberries are mixed with their wholemeal flour and made into cakes which form their staple article of diet. Meat is a luxury used only on special occasions. These people are unsurpassed by any Indian race in perfection of physique; they are long lived, vigorous in youth and age, capable of great endurance and enjoy a remarkable freedom from disease in general. To see a man of this race throw off his scanty garments and plunge into a glacier-fed river in the middle of winter is to realize that enforced restriction to the unsophisticated foods of nature—provided these be of the right kind—is no bar to the attainment of perfection of physique.

"The diet of these three races—the Sikhs, the Pathans and the people of Hunza—provides an interesting example in man of the accuracy of the conclusions drawn by McCollum as a result of his extensive inquiry into the kinds of diets which succeed best in nutrition of animals. Putting aside the carnivorous type of diet on which satisfactory nutrition can be maintained there are two other types which he has found to be successful; (1) the seed, tuber, root and muscle type of diet which is supplemented with liberal amounts of leafy vegetables and or fruit; and (2) the type of diet derived from cereals, legume seeds, tubers, fleshy roots, with or without meat, supplemented with liberal amounts of milk—'milk being so constituted as to make good all the deficiencies of these classes of foods.' The diet of the Sikhs is practically identical with the latter type; that of the Pathans with the former; while that of the people of Hunza is a happy combination of 'the storage parts of plants', leafy vegetables fruit and milk, which gives, perhaps, the best result of all.

"So much then, for the relationship of diet to the physical development of the Indian races. There remains now to consider, very briefly, the extent to which their diets predispose them to disease or secure their freedom from it. We have seen that the grant mass of the people of Bengal and Madras live on a rice-and-legume diet having at least five faults. Associated with these faults we find in Bengalis and Madrasis an unusual susceptibility to infection, a proneness to gastro-intestinal diseases—notably diarrhoea and dysentery—and a marked tendency to certain deficiency diseases—beri-beri, malnutritional oedemas, epidemic dropsy, and xerophthalmia, which are not

exhibited by races whose diet has not these faults. In regard to the proven effect of such food in lowering the natural resistance to infection, it is to be regretted that in India, as elsewhere, epidemiological inquiries have not kept pace with those in the laboratory. But in this connexion it may be remarked that the much higher incidence of leprosy in the South West, and East of India than in the North has probably a nutritional basis. The high incidence of dysentery in the jails of Bengal as compared with its low incidence in those of the Punjab is another example of the same kind.

“ Contrast now with these morbid effects of food having the faults above referred to—faults present in some degree in many dietaries at Home as well as in India—the state of health of the people of Munza who combine their foodstuffs so happily. With them resistance to infection is remarkable: anthrax, for example, does no more than produce a malignant pustule, while septicaemia is its common consequences in those less resistant to infection. Gastro-intestinal complaints—dyspepsia, gastric and duodenal ulcers, colitis and appendicitis—are as uncommon amongst them as they are common elsewhere. Even cancer is so rare that in nine years’ practice I never came across a case of it. It may be that their seclusion or the mountain barriers which separate them from the rest of Asia has kept them free of many diseases carried by infected persons, but there can be no doubt that their freedom from disease is largely due to the food they eat and the health-giving life they lead in a bracing climate.”

After this clear picture of MacCarrison’s of the possible range of diets from foods grown in India, it will be of interest to observe the foods available in our particular area. The following table is a summary of the Food Sources discussed in Chapter I.

References used in identifying the products were :

(a) “ The Commercial Products of India ” by Sir George Watt (Published under the authority of His Majesty’s Secretary of State for India in Council). John Murray, London.

(b) “ Food Grains of India ”, by A. H. Church. Chapman and Hall, London.

(c) “ Flora of the Upper Gangetic Plain ”, by J. F. Duthie.

When names were too local to be found in any of these, specimens were sent to Winfield Dudgeon, PH.D., Botany, of Ewing Christian College, Allahabad, who identified them for us.

Foods available in Karimpur by months

Names			Sources	When available											
English	Local	Botanical		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
<i>Cereals</i>															
Wheat ..	Gahun ..	Triticum vulgare ..	Own fields or other fields of village.	X	X	X	X	X	X	X	X	X	X	X	X
Maize ..	Makka ..	Zea mays ..	Fields of village ..	..	..	..	..	..	X	X	X	X	X	X	X
Rice ..	Dhan ..	Oryza sativa ..	Ditto ..	X	X	X	X	X	X	X	X	X	X	X	X
Millet ..	Marua ..	Eleusine coracana ..	Ditto ..	..	..	..	..	..	X	X	..	..	..	..	..
Italian millet ..	Kakun ..	Setaria italica ..	Ditto ..	..	..	..	..	..	X	X	X	X	..	..	..
Wild millet ..	Dhuniya ..	Like marua ..	Grows wild ..	..	..	..	..	..	X	X	..	..	..	..	..
Little millet ..	Kutki ..	Panicum miliare ..	Fields of village ..	..	..	..	..	..	..	..	X	X	X	..	..
Spiked millet ..	Bajra ..	Pennisetum typhoideum ..	Ditto ..	..	..	..	..	..	..	..	X	X	X	X	X
Poor man's millet ..	Sama ..	Panicum colonum ..	Ditto ..	..	..	..	..	..	..	X	X	..	..	..	..
Great millet ..	Juar ..	Sorghum vulgare ..	Ditto ..	..	..	..	..	..	..	..	X	X	X	X	X
Barley ..	Jao ..	Hordeum vulgare ..	Ditto ..	X	X	X	X	X	X	X	X	X	X	X	X
Wild rice ..	Pasai ..	May be variety of oryza coarctata.	Edges of tanks near village ..	..	..	..	..	..	..	..	X	X	..	..	..
<i>Pulses</i>															
Thick pea (gram) ..	Channa ..	Cicer arietinum ..	Fields of village ..	X	X	X	X	X	X	X	X	X	X	..	X
Cluster bean ..	Dararhi ..	Cyamopsis Psoralioides ..	Ditto ..	..	..	..	..	..	..	X	X	..	..	..	..
Cow pea ..	Ronsa ..	Vigna catjang ..	Ditto ..	..	..	..	..	..	..	X	X	..	..	..	..

[illegible]

*These two reversed by Roxburgh.
 × Available in large amounts.
 × Available in lesser amounts.

Potatoes	Aun ..	Solanum tuberosum	Own fields and vegetable growers.
Horse radish	Senjina ..	Moringa pterygosperma ..	Own fields (pickled)
Carrots ..	Gajar ..	Daucus carota	Local vegetable growers (pickled March-April).
Radish seed pods	Muli ki phali ..	(See radish) ..	Local vegetable growers
Sweet potatoes	Shakkargand ..	Ipomoea batatas	Vegetable growers and own fields.
Cabbage ..	Gantor Band Gobi.	Brassica cleracea, variety capitata.	Mainpuri ..
Buds of labhera.	Labhera ka bor.	Cordia myxa ..	Locally and other villages
Buds of kachnar	Kachnar ..	Bathania variegata	Locally
<i>Leafy vegetables</i>			
Wild potheerb	Nari ..	Ipomoea aquatica	Wild in ponds near village
	Paintiya ..	(Unable to locate)	Wild leaves spread on ground.
A Wild potheerb	Lissua ..	Triumfetta pilosa(?)	Wild in uncultivated areas
Potheerb ..	Chaurai ..	Amaranthus viridis	Wild in fields
Radish top	Muli ki patti	(See radish) ..	Local vegetable growers
White goose-foot	Batua ..	Chenopodium album	In wheat and barley fields
Tops of pea vines	Mattar ki patti	(See peas) ..	Fields of village. (Dried April-July).
Gram tops	Channa ki patti.	(See chick-pea) (gram)	Local fields. (Dried April-July).

Foods available in Karimpur, by months—(continued)

English	Name		Sources	When available											
	Local	Botanical		Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.
Leafy vegetables— (<i>concl.</i>) Chard ..	Palak ..	Beta vulgaris ..	Local vegetable growers and those of Mainpuri.	X	X	X	X	X	X	X	X	X	X	X	X
Mustard tops ..	Karari ..	Brassica campestris ..	Local fields. (Dried March—July).	X	X	X	X	X	X	X	X	X	X	X	X
Fenugreek ..	Methi ..	Trigonella foenum-graecum.	Local fields. (Dried April—July).	X	X	X	X	X	X	X	X	X	X	X	X
Dill ..	Soya ..	Peucedanum graveolens ..	Usually grown with palak ..	..	..	..	..	..	..	..	..	..	..	..	..
<i>Fruit</i>															
Green mangoes ..	Am ..	Mangifera indica ..	Groves, along roadside, around wells. (Pickled or dried after July.)	X	X	X	X	X	X	X	X	X	X	X	..
Wild figs ..	Gular ..	Ficus glomerata ..	Groves of village ..	X	X	X	X	..	..	..	..	..	..	..	..
Mahua blossoms ..	Mahua ke phul. ..	Bassia latifolia ..	Ditto ..	X	X	X	..	..	..	..	..	..	..	..	..
	Bel ..	Aegle marmelos ..	Ditto ..	X	X	X	X	X	..	..	..	..	..	..	X
Berries of peepal ..	Pipali ..	Ficus religiosa ..	Ditto ..	X	X	X	X	..	..	..	..	..	..	..	..
Sweet melon. (Like musk-melon.)	Kharbuz ..	Cucumis melo ..	Locally and other villages ..	X	X	X	X	..	..	..	..	..	..	..	..

[illegible]

The preceding record tells us what foods our village people eat. And the following diet records give us an idea of how much they eat. We cannot hope to arrive at accurate results, with the equipment of village homes and the preparation of illiterate village housewives. These two drawbacks we could have met. But custom rose up to complicate each step.

- To get a representative picture of village food consumption, I thought that we should have records from at least twelve homes each representing a different standard. I could not rely upon the women of these homes to do the recording, as they were not accustomed to measuring their food, and they could not have kept any records of the measurements if they had made them. As was mentioned in connexion with Food Sources, measuring is a casual matter, and is usually comparative—one food balancing another. The two women who could write and whom I could have taught to do the measuring, were kept in strict seclusion within their own courtyards. I had lived in the village long enough to know that my interference in anything related to food would be most unwelcome, even among my best friends. I finally chose three Brahman boys to help in the project. They could write. They were still young enough to be acceptable in any of the homes, and their caste made them doubly welcome. They went into the project very seriously and importantly.

One of the many surprises I had in connexion with it, was the willingness of the women to let the boys write down figures which they themselves could not read. Village men, and still more, village women, have a great fear of written records. In their experience the only exact records have been those kept by Government clerks, rent collectors and grain and money-lenders. As a result they associate recorded figures with oppression. They become restrained at the sight of a note book and pencil. So I learned to make mental notes, to be written down after getting back to our tent. But with the boys, recording took on a different aspect. They flourished their pencils and paper—both rare in the village—and made a great fuss over their measurements and figures. And the women laughed and were willing to humour them. But before the second month was up, their old suspicions were aroused. Some one brought up the question which blocked us repeatedly. Why did we want such figures? They began to imagine that the quantities of food they ate might reveal their status in some way. And this discovery might in turn lead to an increase in taxation. To this road, all paths seemed to lead—fear of increased interest or taxation.

Also, I realized that within certain seasons, the diet is monotonous enough to make records for short periods satisfactory. We waited for a new set of field crops. But in waiting, we missed the wild herbs, and the rainy season vegetables. These may be found in the

partial food records for August and September, appended to this chapter. We renewed our weighing and recording in November. One week was found enough to cover that season.

There were still other complications which added to the interest of record-keeping. In our village we have three distinct systems of weights, for those who aspire to weighing. One is called "kachcha." According to it, one "ser" is 1.4 avoirdupois pounds. The second is called "pakka." According to it, one "ser" is 2.8 avoirdupois pounds. And a third is "sarcari" or "official" amounting to 2.12 pounds. We tried to keep each of our helpers to the system to which he was most accustomed. But they were apt to slip from one to another and back again, without noting the change. This required additional checking.

In the light of these possibilities of error, I make no claims for the dietaries beyond the fact that they are a seriously made estimate of foods eaten in village homes.

The next question we ask is—Do the amounts of these foods eaten meet the needs of the people who eat them. To estimate this, I figured the total daily food allowance necessary for each family, and compared this with the content of the foods eaten by the same family in one average day. The food allowance for each member of a family for a day is calculated according to the suggestions of Edith Hawley. (26). These are then totalled to give the need of the whole family for a day.

Hawley does not include iron. So I have based the allowance for adults on Sherman's "Chemistry of Foods," (27) and that for children is calculated from the amount suggested by Rose and others in a special study of iron intake and output of a girl 31 months old, weighing 31 pounds. They recommend that children two to three years of age receive at least 0.75 milligrams of iron per 100 calories. (28).

The needs of the pregnant women were calculated from figures given by Rose. (29). Those of the nursing mother were calculated from suggestions made by Rose in "Feeding the Family. (30)."

(26), (27), (28), (29), (30), See References page 122.

*Foods eaten by a Brahman family of Karimpur during one week of May, 1928**

Date	Cereal in bread	Parboiled cereal	Rice	Split pulso	Vegetables	Fruit	Milk butter-milk, or curd	Meat	Oil or ghee	Raw sugar or other sweet	Salt
May, 1928	lb. oz.			lb. oz.	lb. oz.		(Milk) qts		(Ghee) lb. oz.	lb. oz.	
25	Wheat 7 0	..	..	Pigeon 1 12 pea.	Cucumber 2 12	Mangoes 8	1½	..	..	5½	..
26	Wheat 3 8 Barley 3 8	..	..	..	Egg plant 2 2	Mangoes 2	1½	..	0 4	1 0	..
27	Wheat 3 8 Barley 3 8	..	..	Pigeon 1 6	Gram tops 0 12	Mangoes 10	1½	..	..	5½	..
28	Wheat 3 8 Barley 3 8	..	..	Pigeon 1 6 pea.	Pumpkin 1 6	Muskmelon 4	1½	..	1 0	5½	..
29	Barley 3 8 Wheat 3 8 Barley 3 8	..	..	Gram 0 6½	Pumpkin 1 6	Mangoes 4	1½	..	..	6	..
30	Wheat 3 8 Barley 3 8	..	..	..	Pumpkin 2 2	Muskmelon 1	1½	..	0 6	5½	..
31	Wheat 3 8 Barley 3 8	..	..	..	Cucumber 0 8	Mangoes 6	1½	..	..	..	..
Total weight.	Wheat 28 0 Barley 21 0	..	..	Pigeon 4 8 pea. Gram .. 0 6½	Cucumber 3 4 Pumpkin 4 14 Egg plant 2 2 Gram tops 0 12	Mangoes 30 Muskmelon 5	10½	..	1 10	2 12	1 lb. (weekly total.)

*Three men (ages 47, 25, 20).

Two women (ages 17, 15).

One boy (age 9—brother of younger woman).

One infant (age 10 months).

One helper (age 12).

Food eaten by a Brahman family of Karimpur during one week of November, 1928*

Date	Cereal in bread	Parched cereal	Rice	Split pulse	Vegetables	Fruit	Milk but-ter-milk	Meat	Oil or ghee	Pickles	Raw sugar or other sweets	Salt
November, 1928.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.				lb. oz.	oz.	lb. oz.	
6	Maize 8 6	Barley 0 3	..	Urd 2 2	Potato 1 6	..	..	..	0 3	3	0 5½	..
7	Maize 3 8	Maize 0 3	..	Mung 1 6	Cauli-flower. 1 6	..	..	..	0 3	..	5½	..
8	Wheat 4 5	Maize 2 12	3 8	Pigeon pea. 1 6	..	..	..	..	..	..	..	..
9	Wheat 8 6	..	..	..	Potato 2 12	..	..	..	..	..	0 5½	..
(One hired man).	Maize 2 2	..	..	..	..	..	..	..	..	..	..	..
10	Maize 7 11	Barley 0 12	..	Pigeon pea. 1 6	..	..	..	..	1½	..	0 8	..
11	Wheat 10 8	..	..	..	Potato 4 3	..	..	..	2 8	3	1 6	..
	(Special cakes for festival. Three lbs. given away).	..	..	..	..	..	..	..	..	..	..	..
12	Wheat 6 5	..	..	..	Potato 2 12	..	..	..	1 0	3	..	..
					Mustard tops. 0 12					3		
Total weight.	Wheat 33 9	Barley 0 15	3 8	Pigeon pea. 2 12	Potato 11 1	..	..	..	3 15½	12	2 14½	1 lb. (weekly total).
	Maize 21 11	Maize 2 15		Urd 2 12	Cauli-flower 1 6							
				Mung 1 6	Mustard tops. 0 12							

*Three men (ages 47, 25, 20).
 Two women (ages, 17, 15).
 One boy (age 9—brother of younger woman).
 One infant (age 10 months).
 One helper (age 12).

*Food eaten by a Carpenter Family of Karimpur during one week of May, 1928**

Date	Cereal in bread	Parched cereal	Rice	Split pulse	Vegetables	Fruit	Milk but-ter milk	Goat meat	Oil or ghee	Pickles	Raw sugar or other sweets	Salt
May, 1928	lb. oz.	lb. oz.		oz.	lb. oz.				oz.	oz.	oz.	
25	Wheat 2 7	..	..	Parched gram. 3	Pumpkin 2 0	Muskmelon 5	..	..	Mustard oil. 4	..	6	..
26	Barley 2 7 Wheat 2 7	..	..	..	..	Muskmelon 4	..	..	Mustard oil. 4	..	..	..
27	Barley 2 7 Barley 2 7	Barley 8	..	Pigeon Pea. 3	..	..	..	..	..	Mangoes 6	5½	..
28	Peas 2 7 Barley 2 7	Barley 8	..	..	Pumpkin 1 6	Mangoes 7	..	..	Mustard oil. 4	..	..	..
29	Peas 2 7 Barley 2 7	..	..	..	Pumpkin 1 6	Watermelon 1	..	..	Mustard oil. 4	..	..	..
30	Peas 2 7 Wheat 2 7	..	..	..	Pumpkin 1 6	Muskmelon 4	..	..	Mustard oil. 4	..	..	..
31	Barley 2 7 Barley 2 7 Peas 2 7	Barley 12	..	..	Pumpkin 1 12	Mangoes 8	..	..	..	..	5½	..
Total weights	Wheat 7 5 Barley 17 1 Peas 9 12	Barley 1 12	..	Gram 3 Pigeon pea. 3	Pumpkin 7 14	Muskmelon 13 Watermelon 1 Mangoes 15	..	..	Mustard oil. 20	Mangoes 6	17	12 oz. (week-ly total).

*Two men (ages 33, 24). | Three women (ages 50, 27, 20).
One girl (age 10). | One boy (age, 4).
One girl (age 3).

*Food eaten by a carpenter family of Karimpur during one week of November, 1928**

Date	Cereal in bread	Parched cereal	Rice	Split pulse	Vegetables	Fruit	Milk, butter, milk	Goat meat	Oil or ghee	Pickles	Raw sugar or other sweets	Salt
November, 1928.	lb. oz.	lb. oz.	lb. oz.	lb. oz.	lb. oz.		Butter milk qts.		lb. oz.	oz.	lb. oz.	
6	Maize 8 6	..	..	Pigeon pea 1 6	..	..	1	..	..	Mango 3	0 5½	..
7	Great millet 7 11	Maize 0 12	..	Pigeon pea 1 6	..	..	..	..	..	..	..	..
8	Maize 7 9	Barley 1 0	..	..	Radishes with tops 1 6 Egyptian arum 1 6	..	..	..	Mustard oil 1½	Mango 3	0 3	..
9	Maize 7 0	Barley 1 0	..	..	..	..	..	..	..	..	..	..
10	Great millet 7 11	..	Puffed rice 1 6	Pigeon pea 1 6	..	Guavas 5	1	..	..	..	..	..
11	Wheat 9	..	..	..	Egyptian arum 2 12	..	1	..	Mustard oil 1½	Mango 1½	0 12	..
Festival puris.	Wheat 7 0	..	..	..	..	..	..	..	Ghee 1 6	Mango 1½	..	..
12												
More puris												
Total weights.	Maize 22 6 Wheat 16 0 Millet 15 6	Maize 0 12 Barley 2 0	Puffed rice 1 6	Pigeon pea 4 2	Radishes 6 Arum 4 2	Guavas 5	3	..	Mustard oil 13½ Ghee 1 6	Mango 9	1 4½	12 oz. weekly total).

*Two men (ages 33, 24).
Three women (ages 50, 27, 20).

One girl (age 10).
One boy (age 4).
One child (age 3)

*Food eaten by an oil presser family of Karimpur during one week of May, 1928**

Date	Cereal in bread	Parched cereal	Rice	Split pulse	Vegetables	Fruit	Milk, butter, milk	Goat meat	Oil or "Ghee"	Pickle	Raw sugar or other sweets	Salt
May, 1928	lb. oz.	lb. oz.		lb. oz.	lb. oz.			lb. oz.	(Oil) oz.		oz.	
25	Wheat 2 12 Barley 2 12	..	..	..	..	..	..	1 6	3	..	..	..
26	Wheat 2 14 Barley 2 14	..	..	Pigeon pea 0 3	..	..	..	..	..	..	..	..
27	Barley 2 14 Wheat 1 14	..	..	Pigeon pea 0 3	..	..	..	..	..	..	..	..
28	Barley 1 14 Gram 1 14	..	..	..	Gourd 1 6	Mangoes 18	..	..	2	..	12	..
29	Wheat 2 12 Barley 2 12	..	..	..	..	Watermelon 2	..	..	..	..	..	..
30	Wheat 1 14	Roasted barley 1 6	..	Parched gram 1 6 Pigeon pea 0 3	..	Watermelon 1	..	..	..	..	..	..
31	Barley 1 14 Gram 1 14	Roasted barley 0 12	..	Pigeon pea 3	..	Watermelon 2	..	0 12	2	..	..	..
Total weights.	Wheat 14 0 Barley 14 0 Gram 5 10	Roasted barley 2 2	..	Pigeon pea 0 12 Parched gram 1 6	Gourd 1 6	Watermelon 5 Mangoes 18	..	2 2	7	..	12	3 oz. (weekly total).

*One man (age 38).
One girl (age 11).
One boy (age 6 months).
One woman (age 27).
One boy (age 6).

*Food eaten by an oil presser family of Karimpur during one week of November, 1928**

Date	Cereal in bread	Parched cereal	Rice	Split pulse	Vegetables	Fruit	Milk, butter-milk	Goat meat	Oil or ghee	Pickles	Raw sugar or other sweet	Salt
November, 1928												
6	Maize 2 12	..	..	lb. oz. Parched gram 0 12	lb. oz. Radishes with tops. 0 12	..	(Butter-milk). Qt. 1	..	Mustard oil 1 1/2	..	lbs. ..	oz. ..
7	Maize 2 12	..	..	Pigeon pea 0 12	..	..	..	..	..	..	..	..
8	Maize 2 0	Roasted wheat 5 1/2	..	Pigeon pea 0 12	..	..	..	..	..	..	0 2	..
9	Maize 4 3	..	..	..	..	..	..	..	..	..	..	..
10	Spiked millet 4 3	Parched corn. 5 1/2	..	..	Spinach 1 6	..	1	..	..	Mangoes 2	..	..
11 (festival).	Wheat 5 9	..	..	Parched gram 0 12	Egyptian arum 2 0	..	..	..	Mustard oil 12 Ghee 12	..	1 0	..
12	Wheat 2 0	..	..	Urd 0 8	..	..	..	..	..	Radish 3	..	..
	Maize 2 12	..	..	..	..	..	..	..	..	..	..	..
Total weights	Maize 14 7 Wheat 7 9 Spiked millet. 4 3	Parched corn 5 1/2 Roasted wheat 5 1/2	..	Pigeon pea 1 8 Parched gram 1 8 Urd 0 8	Radishes 0 12 Spinach 1 6 Arum 2 0	..	2	..	Mustard oil 13 1/2 Ghee 12	Mangoes 2 Radish 3	1 2	3 (weekly total).

*One man (age 38).
One woman (age 27).
One boy (age 6 months).
One girl (age 11).
One boy (age 6).

*Food eaten by an outcaste family of Kari mpur during one week of May, 1928**

Date	Cereal in bread	Pare d cere al	Rice	Split pulse	Vegetables	Fruit	Milk, butter, milk	Ment	Oil "ghee"	Pickles	Raw sugar or other sweets	Salt
May, 1928	lb. oz.			lb. oz.	lb. oz.		(Butter- milk).	oz.		oz.		oz.
25	Wheat 2 12	..	..	..	Pumpkin 0 12	Mangoes 6	$\frac{1}{2}$ qt.	..	..	..	..	..
26	Wheat 1 6 Barley 1 6	..	..	..	..	Mangoes 4	..	..	..	3	..	..
27	Wheat 1 6 Barley 1 6	..	..	..	..	..	..	12	..	..	..	..
28	Wheat 1 6 Barley 1 6	..	..	Pigeon pea, 0 12	..	..	..	..	..	..	..	..
29	Wheat 1 6 Barley 1 6	..	..	Pigeon pea 0 12	..	Mangoes 6	..	..	..	..	..	..
30	Wheat 1 6 Barley 1 6	..	..	..	Pumpkin 1 6	..	..	..	..	..	..	..
31	Wheat 1 6 Barley 1 6	..	..	..	Pumpkin 1 6	Mangoes 4	..	..	..	..	..	..
Total weights.	Barley 8 4 Wheat 11 0	..	..	Pigeon pea 1 8	Pumpkin 3 8	Mangoes 20	$\frac{1}{2}$ qt.	12	..	3	..	$4\frac{1}{2}$ (week- ly total).

*One man (age 22).
One woman (age 50).
One woman (age 18).
One boy (age 3).

*Food eaten by an outcaste family of Karimpur during one week of November, 1928**

Date	Cereal in bread	Parched cereal	Rice	Split pulse	Vegetables	Fruit	Milk, butter-milk.	Oil or ghee	Pickles	Raw sugar or other sweets	Salt
November, 1928.	lb. oz.	oz.		lb. oz.	lb. oz.		(Butter-milk). qt.	lb. oz.	oz.	oz.	oz.
6	Great millet 2 12	..	..	Pigeon pea 0 8	..	..	1	..	Mango 1½	..	..
7	Great millet 2 12	Barley 5½	..	Pigeon pea 0 8	..	..	..	..	..	..	..
8	Maize 3 8	..	..	..	..	..	1	..	..	1½	..
9	Maize 3 2	..	..	Pigeon pea 0 12	..	..	..	..	Mango 1½	..	..
10	Maize 3 2	..	..	Pigeon pea 0 12	..	..	..	..	..	..	..
11 (festival)	Wheat 2 12	..	..	..	Radishes with tops 1 6	..	..	Mustard oil 0 12	Mango 3	8	..
12	Wheat 3 8	..	..	..	..	..	1	Mustard oil 0 12	Mango 3	3	..
Total weights.	Wheat 6 4 Maize 9 12 Great millet 5 8	Barley 5½	..	Pigeon pea 2 8	Radishes with tops 1 6	..	3	Mustard oil 1 8	Pickles 9	12½	5 (weekly total).

*One man (age 22).
One woman (age 50).

One woman (age 18).
One boy (age 3).

The content of the foods eaten had to be based on analyses of the same or similar foods in the West. I realize that their application to foods grown, stored and prepared in homes of North India, can only be an approximation. The food tables in Rose's Laboratory Manual, third edition, 1929, and Sherman's Chemistry of Foods, third edition, 1930, were my chief references, supplemented by Bulletins of the United States Department of Agriculture and of Hawaii.

The calories, carbohydrate, fat, protein, calcium, phosphorus and iron contained in the total amount of each separate food eaten by a family during the week were found. These constituents were then totalled (from all foods eaten during the week) and divided by seven, to get the daily average for the family.

These tables with their requirements based on the comparatively low weights of our village people, imply that the foods which they are getting are adequate, except in calcium. But as we compare their physique with that of the Sikhs, admired by McCarrison, we know that they are low in weight and height. A review of each food constituent may help explain the lack.

Calories—According to the figures estimated, calories are more than sufficient for the oil-presser family, and very nearly adequate for the others, except the carpenters. These calories come chiefly from carbohydrates and protein, which implies that an unusually large amount of both of these must be consumed. Their chief sources are cereals and pulses. The figures for cereals consumed are based on five-sixths of the quantity recorded as being taken out of the store-rooms by the women. We found in—

A comparison of nutritive needs with food consumption of a Brahman family in Karimpur

	Calories	Weights in grams			
		Protein	Minerals		
			Ca.	P.	Fe.
Total amounts needed daily	16,609	422.7	4.600	6.972	.104
Total amounts consumed daily (May, 1928).	13,855	466.8	3.699	13.216	.144
Total amounts consumed daily (November, 1928).	16,865	440.66	2.227	11.539	.120

Estimated daily needs of individual members of family. Total need is based on these figures

	Weight in lb.	Calories	Weights in grams			
			Protein	Minerals		
				Ca.	P.	Fe.
One man (age 47 years) ..	110	2,310	49·5	·550	·990	·015
One man (age 25 years) ..	105	2,205	47·3	·525	·945	·015
One man (age 20 years) ..	115	2,415	51·7	·575	1·035	·015
One woman (age 17 years) lac- tating.	90	2,530	68·0	·787	·970	·018
One woman (age 15 years) pregnant.	85	1,985	45·0	·675	·800	·018
One baby girl (age 10 months)	16					
One boy (age 9 years) ..	54	1,944	70·2	·648	·972	·018
One helper (age 12 years) ..	70	3,220	91·0	·840	1·260	·015
Total ..	..	16,609	422·7	4·600	6·972	·104

A comparison of nutritive needs with food consumption of carpenter family of Karimpur

	Calories	Weights in grams			
		Protein	Minerals		
			Ca.	P.	Fe.
Total amounts needed daily ..	13,230	366·9	4·075	6·725	·097
Total amounts consumed daily (May, 1928.)	7,838	297·3	1·534	7·118	·0924
Total amounts consumed daily (Nov- ember, 1928.)	12,878	364·5	1·5209	7·005	·0771

Estimated daily needs of individual members of family. Total need is based on these figures

	Weight in lbs.	Calories	Weights in grams			
			Protein	Minerals		
				Ca.	P.	Fe.
One man (age 33 years) ..	110	2,310	49·5	·550	·990	·015
One man (age 24 years) ..	105	2,205	47·3	·525	·945	·015
One woman (age 27 years) ..	90	1,890	40·5	·450	·810	·015
One woman (age 50 years) ..	85	1,785	38·3	·425	·760	·015
One woman (age 20 years) ..	95	1,995	42·8	·475	·855	·015
One boy (age 4 years) ..	30	630	42·0	·540	·750	·006
One girl (age 3 years) ..	25	525	35·0	·450	·625	·006
One girl (age 10 years) ..	55	1,890	71·5	·660	·990	·010
Total ..		13,230	366·9	4·075	6·725	·097

A comparison of nutritive need with food consumption of an oil pressure family of Karimpur

	Calories	Weights in grams			
		Protein	Minerals		
			Ca.	P.	Fe.
Total amounts needed daily ..	6,606	196·4	2·148	3·420	·037
Total amounts consumed daily (May, 1928).	8,325	325·85	·993	8·399	·0942
Total amounts consumed daily (November, 1928).	7,479	231·14	1·795	6·441	·0658

Estimated daily needs of individual members of family. Total need is based on these figures

—	Weight in lbs.	Calories	Weights in grams			
			Protein	Minerals		
				Ca.	P.	Fe.
One man (age 38 years) ..	100	2,100	45·0	·500	·900	·015
One woman (age 27 years) ..	80	2,160	36·0	·400	·720	·015
One girl (age 11 years) ..	50	1,050	65·0	·600	·900	·010
One boy (age 6 years) ..	36	1,296	50·4	·048	·900	·009
One boy (age 6 months) ..	12	..	..	..	..	..
Total ..	..	6·606	196·4	2·148	3·420	·037

A comparison of nutritive needs with food consumption of an outcaste family of Karimpur

—	Calories	Weights in grams			
		Protein	Minerals		
			Ca.	P.	Fe.
Total amounts needed daily ..	6,816	162·5	1·868	3·165	·050
Total amounts consumed daily (May, 1928).	4,468	170·19	·714	4·690	·039
Total amounts consumed daily (November, 1928).	5,985	180·8	·862	3·658	·0312

Estimated daily needs of individual members of family. Total need is based on these figures

—	Weight in lbs.	Calories	Weights in grams			
			Protein	Minerals		
				Ca.	P.	Fe.
One man (age 22 years) ..	105	2,205	47·3	·525	·945	·015
One woman (age 50 years) ..	85	1,785	38·3	·425	·760	·015
One woman (age 18 years) ..	90	1,890	40·5	·450	·810	·015
One boy (age 3 years) ..	26	936	36·4	·468	·650	·005
Total ..	..	6,816	162·5	1·868	3·165	·050

a number of experiments with toasted cakes that from every three pounds of grain taken out to be used, eight ounces are lost in grinding and cleaning. The loss in the case of pulses was not recorded. In the Brahman home, the pulses are soaked and the husks removed, but in poorer homes, the whole pulse is usually cooked.

The daily average of carbohydrates recorded as having been eaten by our four village families are as follows :

Carbohydrates in dietaries of four Karimpur families

Family	Month	Daily average (grams)	Per cent. of total calories (daily average) in form of carbohydrates
Brahman	May	2,487·67 g.	72
	November	2,874·22	72
Carpenter	May	1,385·50	71
	November	2,397·38	75
Oil-presser	May	1,371·80	75
	November	1,311·60	70
Outcaste	May	868·4	78
	November	1,013·3	68

McCay in his jail investigations made a study of co-efficients of absorption of carbohydrates. His table is as follows :

Wheat	(23 oz.)	96·5 % absorbed.
Barley	(23 oz.)	96·0 % ..
Great millet		97·8 % ..
Spiked millet		97·8 % ..
Gram	(5 oz.)	97·7 % ..
Pigeon pea		96·8 % ..

Of fats, McCay says, " We have made no investigations on the absorption of fats of the jail dietaries of the United Provinces. The quantity of fat in these diets is very small and did not appear of sufficient importance to warrant special enquiry." (31).

Our figures for the average daily amount of fats used are as follows :

(31) See References, page 122.)

Fats in dietaries of four Karimpur families.

Family	Month	Daily average (grams)	Per cent. of total calories (daily average) in form of fats
Brahman	May	222.34	14
	November	239.56	15
Carpenter	May	110.95	13
	November	201.28	14
Oil-presser	May	86.50	9
	November	141.19	17
Outcaste	May	30.65	6
	November	126.45	19

The larger amount consumed by all families in November is due to the advent of a special festival. Wheat and *ghee* were subtracted from the original figures of the Brahman family, to allow for cakes distributed to dependants. A lesser amount of wheat and mustard oil was subtracted from the figures given by the carpenter, as they too have begging callers at this time. But after these amounts have been deducted, the festival figures still stand high.

The Brahmans of the village are reputed as using more *ghee* than others. This may be accounted for by their comparative prosperity, and by the greater demand for "pakka" food among them. This is discussed under Food Practices.

In most proposed dietaries, the calories furnished by protein are listed separately, whereas those of fats and carbohydrates are lumped together. Lusk has collected standard dietaries, a study of which may be useful.

"The 'standard' dietaries are given below, not because they are inflexible requirements in any sense of the word, but merely for the convenience of the reader. The individual standard will ever be controlled by climate, the amount and kind of mechanical effort, by appetite, purse and dietetic prejudice."

“ Standard dietaries for a man of 70 kilograms.

(Weights in grams)

					Voit	Rubner
Light work—						
Protein	..	..	..	..	..	123
Fat ..	..	..	..	..	..	46
Carbohydrates	..	..	..	..	..	377
Calories	..	..	..	..	..	2,445
Medium work—						
Protein	..	..	..	..	118	127
Fat ..	..	..	..	..	56	52
Carbohydrates	..	..	..	..	500	500
Calories	..	..	..	..	3,005	2,868
Hard work—						
Protein	..	..	..	..	145	165
Fat ..	..	..	..	..	100	70
Carbohydrates	..	..	..	..	500	565
Calories	..	..	..	..	3,574	3,36,232

The calorie make-up of our village dietaries, compare with these standard dietaries as follows :

				Per cent. of total calories		
Constituent				Voit	Rubner	Karimpur (May)
Protein	..	..	..	15—17	18—20	14—16
Fat	..	..	..	16—25	16—19	6—14
Carbohydrates	..	..	..	65—67	62—71	71—78

According to this, our village diets are high in carbohydrates, while protein, and especially fat, are low. This is what we might expect when cereals are used so extensively, and when proteins come from vegetable rather than animal sources.

Protein—In writing of protein standards for family dietaries Sherman states, “ To allow for varying conditions and for individual preferences as well as to provide a liberal margin for safety it is customary to consider that from 10 to 15 per cent. of the total calories may

be in the form of protein." (33). The daily average of protein in our tables is as follows:

Protein in dietaries of four Karimpur families

Family	Month	Daily average (grams)	Per cent. of total calories (daily average) in form of protein
Brahman	May	466·8	14
	November	440·7	13
Carpenter	May	297·3	16
	November	364·5	11
Oil-presser	May	325·9	16
	November	231·14	13
Outcaste	May	170·19	16
	November	180·80	13

Although the protein according to figures in the record of food consumed appears to be more than the amount needed, with one exception (the carpenter family in May), it does not exceed the percentage of calories suggested as correct by Sherman (10 to 15 per cent.).

McCay (34) gives the following table of percentage absorption of proteins of the food materials in use in the jail dietaries of the United Provinces.

Food stuff	Absorption of protein
Wheat	67·10
Arhar "dal" (pigeon pea) plus vegetables.. ..	80·50
Arhar "dal" (pigeon pea) alone	81·84
Gram "dal" (split gram)	64·20
Barley	57·60
Juar (great millet)	53·00
"Urd"	69·20
"Bajra" (spiked millet)	49·40

From this he concludes: It cannot be for the welfare of the body that an average of 34 grams of protein daily should remain incapable of absorption, which, while in the bowel, provides a splendid culture medium for the growth of putrefactive micro-organisms." (35).

He comments on the importance of the methods of treatment of foods, especially the split pulses, in relation to their absorption. "Gram dal, for instance, is usually given as a morning meal in the form of parched gram, i.e. simply fried or heated until the greater part of the contained moisture of got rid of; no steps whatever are taken to

break up the grains so that the digestive juices may have a proper opportunity of carrying out their work satisfactorily. Investigations on the absorption of pea and lentil flour, properly cooked, show that the protein is all taken up except about 8 to 9 per cent. If, however, the pulse is not given in a state of fine division, the loss of protein has been found to rise to 40 per cent." (36).

• Not only must the absorption of proteins be considered, but also their ability to meet body needs after absorption. This ability apparently depends upon the amino-acids which the proteins yield on digestion. Therefore, "It seem logical to prefer to serve the needs of the body by providing it with the optimal amount of such proteins as can be utilized very effectively rather than to require it to digest and assimilate an excessive amount of proteins of low value" (37).

A group of Indians are undertaking a study of the pulses which are the chief sources of protein in the Indian diet. Their first study was that of the globulins of the pigeon pea and field pea, both of which are used in our village. They conclude that "Both the globulins compare favourably with casein and contain requisite amounts of arginine, histidine, and lysine. The arginine content of both the globulins is higher than that of casein, being nearly double in the case of the globulin of *Pisum arvense* field pea. The two globulins are, however, very deficient in both cystine and tryptophane. These legumes are usually taken with cereals and are useful in supplying the essential *diamino* acids especially lysine in which cereal proteins are usually deficient." (38).

Later they studied the values of the lentil (*lens esculenta*), cow pea (*vigna catjang*), the aconite bean (the "moth" of our village). They found that all three pulses contain lysine, histidine, arginine, cystine, tyrosine and tryptophane. Their comparison of their utility is: "The analysis of the three globulins shows that the globulin of *lens esculenta* is characterized by its higher content of lysine and arginine. The net protein values

$$\frac{\text{content of digestible protein} \times \text{biological value}}{100}$$

of the pulse calculated from the metabolism data are given in the following table:

Pulse				Total Protein (N × 6.25)	Net Protein value
				Per cent.	Per cent.
Lens Esculenta	..	..	..	28.74	12.86
Vigna catjang	..	..	..	26.52	11.05
Phaseolus aconito folius	..	..	..	27.09	9.04

(36), (37), (38) See References, page 122

At a 10 per cent. level of intake, the proteins of *lens esculenta* are highly digestible while those of *vigna catjang* have a high biological value. *Phaseolus aconitifolius* is poor in both respects." (39).

It is interesting that the aconite bean ("moth") is very little cultivated by our people. They seem to keep it especially for invalids. Lentils are not common in Karimpur.

McCollum and Simmonds contribute experimental evidence on the possibility of vegetarian diets. They state that in their own earlier experiments and those of Slonaker, vegetarian rats "grew to about half the size and lived half as long as did their fellows receiving animal food." (40).

Later, McCollum and Simmonds found that it was necessary to introduce a very large quantity of leafy vegetables into a diet of seeds and legumes, to induce normal growth and development in omnivorous animals. Their most satisfactory combination was, "maize 50, alfalfa leaf (dry) 30, and cooked dried peas 20 per cent. The ingredients were ground together so that these proportions were eaten." (41). Their conclusion is: "It is possible that better mixtures of vegetable foods may be found, but these results show definitely that for the omnivorous type of animal, whose digestive tract is small, the consumption of sufficient volumes of leafy foods is impossible." (42).

In regard to the effect of a purely vegetarian diet on men they conclude that, "It is possible to make a fairly satisfactory diet of foods derived entirely from vegetable sources, but it is not easy to do so. It would be difficult for man to eat enough leafy foods to enable him to succeed with a strictly vegetarian diet. Such a diet will generally be low in protein." (43).

Our village people supply the necessary protein from the pulses, or legumes. But a more successful diet has been worked out by the Sikhs and others further North, who occasionally eat meat and eggs, and drink large quantities of milk. The success of the Sikhs is in agreement with the suggestion of McCollum and Simmonds. "When one adheres to such a regimen (vegetarianism) the addition of small amounts of meat will be valuable, and eggs, because of their relative richness in vitamins A and B, will often be a more effective supplement. The same may be said of glandular organs." (44). The close of their discussion is interesting from the point of view of our study.

"Many of the people of China and Japan, because of poverty and overcrowding, can afford only small additions of fish, poultry, eggs, or the flesh of mammals to a diet which consists in great measure of vegetable foods. From an early age the children are schooled to eat large amounts of leafy vegetables. Many weeds are eagerly sought after and trees are stripped of their buds in spring to supplement the supply of spinach, cabbage, and other leafy foods." This might

almost have been written of our village. It explains the gathering of wild potherbs and the picking of tops of growing plants as well as the eagerness for buds of plum trees.

Repeated studies have shown that whereas proteins of plant origin may be adequate for full-grown adults, they do not contain all of the amino acids which must be supplied in the building of strong new bodies, and they are therefore not sufficient for growing children. Children should have the protein of milk or milk products, and other animal proteins if possible.

Calcium and phosphorus—Calcium is the most consistent deficiency shown in our comparison of food needs and food consumption. Calcium in the Brahman family is higher in May than in November. They also had milk during May, and not in November. The oil-pressor's calcium rises in November along with the addition of two quarts of buttermilk. In the outcaste family there was a similar increase in calcium with the addition of milk.

Our American dentist in India told us that there was a deficiency of calcium in the milk of Indian cows and buffaloes. He prescribed calcium lactate for our children.

My own experience with teeth and pregnancy has caused me to wonder about calcium in Indian foods. There seems to be no lack of phosphorus. I lost two teeth with each new baby. I realized that it must be that my own body calcium was being used to build the baby's bones and drank quantities of milk to renew the supply. If I, with over a quart of milk a day, suffered from calcium shortage or from improper balance of calcium and phosphorus, the condition of village mothers should be worse. And it is. They suffer greatly with their teeth, and of course have never heard of a dentist.

The cereals are secondary sources of calcium, and become important because of the large quantities in which they are eaten. Raw cane sugar also supplies calcium. And it is the only sugar used in the village. In the absence of definite information I have credited *ghee* with an amount of calcium equivalent to that in butter. But I feel sure that it should be less, as some calcium must be lost with the protein which, separated during long cooking, is strained off.

Phosphorus—It is apparent from our figures that we need not be concerned over a shortage of phosphorus in the diet. The cereals and pulses supply it in generous amounts. But we cannot count on American figures to represent accurately the amount of phosphorus in Indian foods. This is one element which is known to vary in different soils.

Our chief interest in phosphorus is in its relation to calcium in the work of bone-building. The village children apparently get plenty of phosphorus, but their calcium is deficient. This increases the importance of sunshine in maintaining a proper balance between the two. This will be discussed further, in connexion with Vitamin D.

Iron—Of the several surprises which came to me from the comparison of the needs and the foods consumed in the village, the greatest was the iron. I expected to find a striking deficiency here. But deficiency appears only in the carpenter family in November, and the outcaste family in both May and November.

Here again, as with phosphorus, the cereals and legumes are important. "Most of these grains (wheat, barley, millet, maize, rice) are eaten whole; they are not subjected to any milling or refining process before use. The outer layers of the grain and embryo, containing valuable dietary constituents, are thus consumed with the endosperm." (45).

This use of the whole grains is important to people who are near the margin of deficiency of minerals, especially iron. The green foods which supply our people with iron are not prominent either in May or November. The oil-presser managed to get some spinach. Potatoes appear, in the Brahman family in November, and raw sugar appears in every family as a source of iron.

But with iron as with other food elements, we cannot base our conclusions as to its utilization on figures representing its appearance in the foods we eat.

"Recent research shows that the percentage of iron contained in a food is not by itself an adequate measure of the value of that food in meeting the iron requirement of the body." (46).

Experiments with different food combinations reported by Sherman have shown different degrees of assimilation of the iron. He points out that further research will be necessary before these variations in iron values from equivalent iron contents can be explained.

Vitamins—The prevalence of eye infections prepares one for a deficiency of Vitamin A. And a study of the foods eaten shows that a deficiency exists. We do not know just how much A is lost in the heating of milk, its churning and standing and final long heating, in the preparation of *ghi*. According to McCollum and Simmonds A is readily oxidized at higher temperatures, but is relatively stable under conditions generally maintained in the cooking of foods. (47). However, the supply of A from milk is not what we might count on in an American village where butter is used in place of *ghi*. Mustard oil is not an efficient source of A, as A is absent or present in but traces in fats or oils of vegetable origin. Moreover, the percentage of total fat in the diet is low.

Carrots are a possible source of Vitamin A. A report on a study of carrots made by Bills and McDonald showed that the most highly coloured carrots contained 9.6 mg. carotene per 100 g. White varieties contained only about one-eightieth of this amount. (48).

(45), (46), (47), (48) See References, page 123.

The thin, green leaves of plants have been found to be richer in A than the thicker or whiter leaves. This may help to explain the popularity of the tender tips of leguminous plants.

Vitamin B is supplied by the cereals and pulses which our people eat in abundance. Fortunately it is not harmed in drying and not easily destroyed in cooking. McCarrison demonstrates by experiment the high value of wheat, and the almost equal value of great millet and spiked millet, in Vitamin B as compared with rice. (49). The amount of B which village people get in their cereal flour is greater than that of the town dwellers who pride themselves on their thin cakes, made of white flour.

In vitamin B as in A, the leafy vegetables, including mustard greens, make a small contribution. Meat can only be reckoned as a source of Vitamins in a few cases.

There is little chance of getting a satisfactory supply of B₂ for the women and children, since the men drink most of the butter-milk. They refuse meat, and the idea of yeast is repulsive to them. Indian mothers see the growth of our children and ask why they grow so much faster and are so much more vigorous than village children. Vitamins may be the answer.

We have talked in terms of vitamin C during the past few years. But long before it was called this, an antiscorbutic value was attributed to foods containing it. As has been mentioned, the tamarind was regarded as an antiscorbutic food, in ancient Sanskrit medicine. McCay in his investigations quotes the rules from the jail code, made before 1911. "1061.—Between the first of April and the first of November when the supply of antiscorbutic vegetables is very indifferent, provision should be made for the daily issuance of an allowance of lime-juice, tamarind pulp, or anchur (dried green mangoes) to each prisoner." (50).

Mangoes are probably our most important available source of C. The following report promises further information on its potency. Several varieties of mango were studied.

"The pulp of the "Alphonso" is stated to be one of the most potent known sources of vitamin C and compares favourably with lemon juice, while "cawaije Patel" is only slightly less active. The 'Shundrya' variety is comparatively poor.

"The vitamin A content of the pulp of all three varieties is comparable with that of butter. The "Alphonso" variety was found to be rather better than the other two." (51).

Not knowing what variety of mangoes we have, we hardly know what this study may mean to our village. But it promises further helpful information.

A study of the vitamin C content of Indian food-stuffs made in the nutrition research laboratories, Coonoor, in 1935, adds certain other foods to the list of sources of vitamin C. Among the foods available in our village, which supply vitamin C, they would include ripe gauvas, amaranth leaves, green mango pickle (tender, preserved in salt), green chillies, coriander leaves, cabbage (fresh inner leaves), bitter gourd, cauliflower, spinach (fresh), and turnip. Long standing, or cooking in an open vessel endangers the vitamin C.

(49), (50), (51) See References, page 123

Our village babies get less vitamin C than their elders. Many babies have been brought to me who seem similar to those described by McCollum thus: "The baby may become pale, lose its appetite and cease to gain. This condition has been termed 'latent scurvy,' and is more to be feared today than the florid, acute form." (52).

With the balance between calcium and phosphorus as doubtful as it is in our village, vitamin D becomes especially important. No one in the village buys codliver oil, as it is too expensive. Fortunately for our children, they are generously supplied with D through exposure to sunshine. We are not certain of the optimal content in the diet of calcium and phosphorus, but we do know that "when the skin is irradiated with light containing a suitable content of ultra-violet rays, normal calcium and phosphorus metabolism will be maintained, even when the proportions of the bone-forming elements are unfavourable." (53) This refers to unfavourable proportions, but may not apply in case there is actual shortage of calcium or phosphorus.

In surveying the foods eaten by the people of Karimpur, in relation to their needs, we are aware of deficiency, but not any one specific deficiency. We know that the men are not as large, and have not as much resistance to infection as their countrymen, the Sikhs. We know that the women and children are not suffering from any striking illness caused by absence of certain food elements, but they are not as strong as they should be. Figures do not demonstrate many conspicuous faults in the diet. And yet we know that there is not the highest degree of nutrition which might be obtained from the foods available. Rainy Season diets—not analyzed.

*Diet of a Brahman family in Karimpur**

Date	Cereal in bread		Split pulse	Vegetables	Milk, butter-milk	Salt
August, 1927	lb.	lb. oz.	lb. oz.	lb. oz.	(Butter-milk) qt.	oz.
13	Wheat .. 14			Gourd .. 5 8	2	..
14	" .. 7	Field peas 3 6		" ..	2	..
15	Barley .. 7					
15	Wheat .. 7	Mung .. 2 13		" ..	..	..
16	Barley .. 1					
16	Wheat .. 14	Pigeon .. 1 6		" ..	..	..
17	" .. 7	pea. Urd .. 1 6		" ..	..	..
18	" .. 7	Urd .. 2 13		Mushrooms 0 12	..	..
	Barley .. 7					
19	Wheat .. 14	..		Egypt arum 2 13	2	16
				Gourd .. 1 6		

*Three women, three men, three children.
(52), (53) See References, page 123

*Diet of a farmer family in Karimpur**

Date	Cereals		Vegetables		Milk butter- milk	Fruit	Salt
August, 1927	lb. oz.		lb. oz.		(Butter- milk) qt.	(Dried mango) oz.	oz.
13	Wheat	.. 4 4	Gourd	.. 1 4	1½	..	..
14	Barley	.. 4 4	Mushroom	.. 0 12	1½	..	..
15	„	.. 4 4	..	..	1½	12	..
16	„	.. 4 4	Mushroom	.. 0 12	1½	..	..
17	„	.. 4 4	..	..	1½	..	..
18	„	.. 4 4	..	..	1½	..	..
19	„	.. 4 4	Gourd	.. 1 4	1½	..	8

*Two men, one woman, one child

Diet of an outcaste family in Karimpur†

Date	Cereal		Split pulse (field pea)	Vegetable		Sweet	Salt
August, 1927	lb. oz.		lb. oz.	lb. oz.		lb. oz.	lb. oz.
13	Wheat flour	6 0	..	Egypt arum	2 0	..	..
14	Ditto	.. 7 0	..	Mushrooms	0 12	..	..
15	Barley flour	2 5	..	Wild potherb (nari).	1 6	..	..
	Field pea flour	2 5					
	Chick pea flour	2 5					
16	Wheat flour	2 5	1 6	..	..	..	..
	Barley flour	2 5					
	Chick pea flour	2 5					
17	Barley flour	2 12	..	..	..	..	..
	Field pea flour	2 12					
	Maize flour	1 6					
18	Wheat flour	2 5	..	Wild potherb (nari).	1 6	..	..
	Barley flour	2 5					
	Chick pea flour	2 5					
19	Wheat flour	7 0	..	Wild potherb (nari).	1 6	1 2	0 12

†Three men, one woman, two children.

Diet of a Muhammadan family in Karimpur (Most of the food for this particular family is begged from Brahman farmers)*

Date	Cereals	Split pulse	Vegetables	Meat	Salt
August, 1927	lb. oz.	oz.	lb. oz.	lb.	oz.
13	Wheat 3 8	..	Egypt arum 0 12	..	..
14	 1 2	..	Wild potherb (nari) 0 12	..	..
	Barley 1 2				
	Chick pea 1 2				
15	Barley 1 10	..	Egypt arum 0 12	..	..
	Peas .. 1 10	..			
16	Wheat 3 8	..	Wild potherb 0 12	..	..
17	 1 10	Pigeon pea. 5 1/2.	..	..	
	Barley 1 10				
18	 1 10	..	Egypt arum 0 12	..	..
	Peas .. 1 10				
19	Wheat 3 8	..	..	2	5

*Two men, one woman, one child.

VI—CONCLUSION

RECOMMENDATIONS

Several years ago an English deputy commissioner set out to improve conditions in a whole government district, not far from ours. His faith was great. In the record of his work he writes, "The secret of all success in the villages is propaganda, and the campaign that has been going on for the last seven years has been wonderfully successful."

"Things undreamt of before, things supposed to be utterly opposed to every custom and sentiment, have come to pass easily and naturally, all owing to continuous and intensive propaganda." (54),

If my confidence were as great as his, I would go first to the village elders, and then to the mothers, with the suggestions which follow.

To the elders I would suggest :

(1) Start orange groves, like those in Kaimganj, fifty miles away.

(2) Replace the old mango trees with new ones.

(3) Grow more potatoes.

(4) Learn from the co-operative society in Fatehgarh, forty miles away, how to store potatoes.

(5) Allow the vegetable growers to raise tomatoes.

(6) Advise the vegetable growers to add more leafy vegetables such as cabbage and chard to their crops.

(7) Get information from the Mainpuri Government experiment farm, on how to get a better milk supply. We have made our contribution to this by securing a high grade bull from the provincial government.

(8) Pass a ruling that fruits must not be picked, or knocked off of trees, until they are ripe. Explain to the men and boys that they will get more from the larger ripe fruit.

If I could find mothers willing to forget custom, I would advise them as follows :

(1) Use wheat for the children as far as possible, and keep the millets and barley for festivals and adult visitors.

(2) If there is little wheat, it is better to mix some of it with other cereals rather than use it up and then give the others, such as millets, alone.

(3) Grind all flour finer for the smaller children, and sift it through coarse cloth as you do now, for special festival cakes.

(4) Use pigeon pea in preference to other pulses. Use the others occasionally, for variety, preferably "mung" or "urd."

(5) Do more than split the pulses. Break them up with the light mill. Or better still, soak the pulse for one day and night; spread it out in a shady corner of the courtyard and keep it covered with a damp cloth until it sprouts. The children will like it.

(6) Ask husbands to give the children more of the buttermilk.

(7) Or give each child a glass of the fresh milk each day. Give each one two or three glasses, if possible. This takes for granted that there is a milk animal—as there is in most homes.

(8) On days when there is milk for the children, give them less pulse.

(9) Rather than fry cakes in “ghi” for the children, toast the cakes and spread them with fresh butter.

(10) If the butter used means a shortage of “ghi”, mustard oil can replace the “ghi” for most purposes.

(11) Get eggs; if possible, so that each child will have one or two a week, and gradually increase to four or five a week.

(12) Cook potatoes at least four times a week, if possible. They may be combined with other vegetables and cooked as at present.

(13) Use dasheen (Egyptian arum) during the months when potatoes are not in season.

(14) Cook whatever vegetable is in season, along with potatoes or dasheen. Most vegetables require less cooking than potatoes, and can be added later in the cooking process.

(15) Let the children eat raw carrots, potatoes and cucumbers when there is no cholera in the district.

(16) Try drying carrots, by slicing them thin and spreading them in the sun—as mangoes are dried. Use them in vegetable mixtures when gourds and pumpkins are the chief vegetables in season.

(17) Have a green vegetable at the meal when “kachcha” food can be most easily served. The children can gather fresh potherbs in the rainy season and early fall; and fenugreek and the green tops of peas, gram and mustard plants in the late fall and winter. These same leaves can be dried for the spring, and supplemented with fresh radish tops.

(18) Let the children gather and eat each fruit in its season but encourage them to let the fruit ripen, at home in the sun if not on the trees.

(19) When husbands go to the bazar, ask them to bring home oranges in season, or tomatoes, if they are cheaper.

(20) Plan the children's and your own meals something like this :

Morning—Left-over cakes of wheat or mixed flour, or "satua" (parched cereal) ground finer than for the men. Milk or buttermilk with either one. Allow at least 1 pao (1 cup) for each of the children. Fruit, if there is any.

Noon—Fresh cakes of wheat or mixed flour. Vegetables, —potato and one other. Pulse broken up and cooked thoroughly, with mango, fresh or dried, to flavour it. Or sprouted pulse.

Night—Cakes left from noon, with green vegetable cooked in usual way, one cup of milk or buttermilk for each of the children.

(21) Set regular meal hours for the children and yourselves, as for the men. Ask the children to bring home the eatables they collect from the fields and groves, and share them with you at meal time.

(22) Let them play in the sunshine as they do now, with as few clothes as they now wear.

For the mother of a new baby, I would add the following :

(1) Nurse him for two years, if you want to, and if neither you nor he loses weight begin supplementing your milk with goat's or cow's milk, when he is about a year old, so that he will accept it when your milk is insufficient.

(2) Eat the same kinds of food that you prepare for the children but eat more of them and drink milk if you can possibly get it. You are feeding the baby as well as yourself.

(3) If the baby shows no gain in weight, or cries a great deal, start giving him other food, gradually.

(4) Do not feed him whenever he cries, but try to feed him four times each day, when the shadows are at the same place.

(5) When you start giving him other food do it gradually, beginning with boiled goat's milk diluted with water. You can give him some of the rice water which you drink. Put a little partly ground wheat in a small kettle if you have it, and let it stand beside the milk that is simmering. When it has cooked several hours, strain it and give the liquid to him. When he is about a year old, you can give him some of the potato and other vegetable which you cook, before adding the spices. Mash the vegetable with your cooking spoon. Give him some of the liquid from the green leaves which you cook, before adding spices. Let him have a taste of the egg-yolk prepared for one of the older children. As he gets used to it, add more, until he has one yolk each day. When he has plenty of teeth for chewing, give him a piece of toasted bread, hard enough so that he must

chew it before swallowing. Be sure that the flour used in his bread is finely ground. If you cannot get tomato or orange or cabbage juice for him, give him some raw potato, scraped off with the bowl of the iron spoon. As he gets older, give him some of the split pulse cooked for the family, but cooked longer, and mashed. Better still, cook some of the sprouted pulse for two or three minutes for him. Cook the milder fruits which the children bring home, sweeten them and give him the juice. Later he can have the pulp. As he grows, increase the milk, to at least half a quart.

This might go on indefinitely, with all of the detailed instructions used in America for new mothers. It may sound inadequate from the Western point of view. But it is so far beyond present practices in our village that it sounds like the chapter in Mr. Brayne's "Remaking of Village India", called "The Dream".

The reasons for most of the foregoing suggestions are obvious. The suggestions to the village elders are explained by what I have already said of present custom and the shortcomings of the local food supply. The elders demand that each proposal will bring them profit, economic or religious. Health has not yet become equally important with these two. Furthermore, the elders must be satisfied that the proposals are worthwhile before anyone else in the village will consider carrying them out. All this demands more tact and resourcefulness than scientific information.

The reasons for the suggestions concerning foods for children are as follows:

Wheat yields more fat and more minerals per 100 calories than the other cereals do. Moreover experiments have shown that the proteins of wheat more successfully supplement those of pulses, or legumes. McCollum and Simmonds in studying vegetable proteins conclude that "There are however, some remarkable instances of effective supplementing between certain cereals and certain legume seeds. Conspicuous among these successful combinations is wheat and pea. . . . Maize and pea, fed in combination parallel to the wheat and pea relation just mentioned, was almost a failure for the nutrition of the rat. Animals confined to this diet, the only fault of which lay in its protein moiety grew slowly and remained stunted. Fertility was very low and the second generation increased very slowly in weight." Of the combinations used in their experiments, only the wheat and the maize combined with peas are like our village diets.

Our village friends tell us that they used to eat more wheat. But since foreign trade has been introduced, the price of wheat has gone up from 40 pounds to the rupee, to 16 pounds to the rupee. As a result, they sell as much wheat as possible, and hoard the money, while living on inferior grains.

The pigeon pea is recommended, as a source of protein, partly because a larger percentage of it is absorbed than of other pulses. This was shown by McCay's work, reported on page 102. Also, the studies of Niyogi and his co-workers have shown the pigeon pea to be a comparatively satisfactory source of protein, when used with cereals (page 103).

However, the net value of the protein of Indian pulses is shown to be only about 50 per cent. of the total protein content (page 103). This means great waste, and unprofitable expenditure of energy in its digestion and assimilation.

For this reason, milk or buttermilk are proposed to replace a part of the protein now contributed by pulses. A larger percentage of the protein of milk is assimilated than that of pulses, and the amino acid content of milk protein is more complete. At the same time, milk supplies other materials, such as vitamin A, and provides the calcium in which village diets are conspicuously deficient. Because of these qualities of milk, McCollum calls it a "protective food." "Milk and the leafy vegetables are the only foods so constituted as to make good the deficiencies of cereal grains, legume seeds, tubers, roots and muscle meats. For this reason, McCollum proposed that these foods should be designated 'protective foods' in order to give them the prominence they deserve." (55).

A number of experiments have been made, testing the effect of milk on children. The following from New Zealand where life is comparable to that in our village, is of interest to us. It is reported in Nutrition Abstracts and Reviews, Volume II, no. 2. A test group of 93 Maori children (age 5 to 14 years) received fresh milk daily ($\frac{1}{2}$ to 1 pint per child) for 13 weeks, during which period records were kept of their height and weight. Children of another school provided a control group. The children in the test group showed twice the increase in height and two and a half times the gain in weight of those in the control group.

A marked decrease in the incidence of scabies and impetigo was noted among the children receiving milk. There also seemed to be an improvement in their mental alertness. (56).

Butter is suggested to replace ghee on the supposition that in the long standing and heating preparatory to the final production of ghee, there is a loss in vitamin A. And the village diet needs a supply of vitamin A badly. This is evidenced by the sore eyes and the corneal ulcers shown us by parents who hope that we can magically restore sight. When the butter is heated and strained, much of the protein is strained out, and some of the minerals undoubtedly go with it. We have no exact information on this. Ghee is such an important item in diets all over India that it will surely receive examination from Indian nutritionists.

Egg yolk is suggested as another possible source of vitamin A combined with fat and iron and protein of high value. But the adoption of eggs is very doubtful among caste Hindus. For this same reason, meat was not suggested as a children's food, in the list above. The prejudice against it is even greater than that against eggs. Moreover, the meat now available comes from old, decrepit animals, and cannot be recommended for children.

Carrots are advised chiefly because of their vitamin A content.

Potatoes are suggested as a substitute for part of the cereal, now consumed in such large quantities. They are a cheap source of carbohydrate, and at the same time bring in certain constituents such as vitamin C, and iron, which cereals provide in lesser amounts, in proportion to calories supplied.

The germinating legume seeds, and green vegetables are easily obtained contributors of vitamin C, along with the mangoes and tamarinds, and certain other fruits. Oranges are within reach, and may come into use gradually. But the introduction of tomatoes, while simpler from the physical standpoint, will depend on influences other than soil, or nutrition.

All of these suggestions are general, and will require special application in individual cases. I have no illusions as to the difficulty of securing their adoption. Back in the village, I shall be bound by the circle of complicating factors. But each suggestion will find reception somewhere. In high caste homes, where eggs are taboo, there is usually an abundance of milk, and great respect for any product of the cow. In outcaste homes where there is little or no milk, chickens are kept. Even in these outcaste homes, a goat is possible, thanks to free grazing.

The feeding of babies during weaning, as given in the list for new mothers above, is a task which we must undertake seriously. I have gone through the experience with mother after mother, of watching a beautiful baby wither, and feebly slip away. And we have not known what to do. Also, I have gone through the suspense of the feeding of my own babies, and appreciate what it means to have guidance at this time. At present some of our babies gradually starve to death on mother's milk, while their mothers pride themselves on the fact that the babies want to no other food. Others find themselves suddenly replaced by a new brother or sister, with coarse cereal cakes and stewed pulse as their new fare. There is a disease called "sukhi" (drying up) among our babies. We could not locate its source, but now I believe that it can be traced to one or perhaps both of the above situations.

There are various methods of treating "sukhi," chiefly with charms and taboos. But I have found no suggestion of its relation to faulty

nutrition. It is one phase of feeding which I want most to study on our return to the village.

THE PROBLEM

In approaching this problem of foods in our Hindu village of North India, we should inform ourselves on the following :

- (1) The people, their physical condition, including resistance to disease.
- (2) The attitude of the people towards suggested practices.
- (3) The foods available locally, with some information on the comparative consumption of each.
- (4) The treatment of the foods, including customary practices.
- (5) The value of foods used.

We have acquainted ourselves with the first, third and fourth of these through personal observation and inquiry. With the help of medical friends we hope to learn more of the physical condition of the people when we return among them. Our information on the fifth point comes from various sources, chiefly Western. This field has scarcely been touched in India. The second opens up a whole new field which we hope to investigate.

In trying to solve the problem of how to make the foods of our Hindu village more adequate, further points must be kept in mind.

- (1) The foods emphasized should be among those available and those acceptable to at least a part of the community.
- (2) The proposals in regard to the treatment of food should be built on familiar practice and should be made with consideration for existing custom and prejudice.
- (3) The values of foods recommended, and the treatment of them suggested, should be built upon evidence presented by reputable scientists.

I have kept these points before me in presenting solutions of the problem. With my own knowledge of the foods available, and of current food practices, and with the support of McCarrison, McCollum, Rose, Sherman and others, I know that my suggestions are harmless, at least. With the example of the Sikhs who live not far from us and who have practically the same food resources as our people, I know that we are striving toward something attainable and worthwhile. The problem has resolved itself to a simple matching of human needs and a comparatively satisfactory food supply. McCarrison has expressed the result very simply in his Primer intended for Indian school children.

"The right kind of food for Indian children and indeed, for children in any country is one made up of the following simple things:

(1) any whole cereal grain or mixture of cereal grains; (2) plenty of milk and the products of milk—curds, buttermilk, butter, *ghee*; (3) sprouted pulses; (4) eggs or liver, or meat, or fish occasionally, if religion permits their use; (5) tuber and root vegetables; (6) abundance of green leafy vegetables; and, (7) fruit.”

It sounds very simple. And we have satisfied ourselves that it is right.

But the hardest task of all remains. Our village folk are illiterate and their lives are directed by custom, and fear of spirits. We cannot give them the reasons which Science offers for adopting the new food practices recommended here. The propaganda method of the English commissioner did not prove itself lasting after his departure. Then, how are we going to help our people to feel a need for better food to such an extent that they will be ready to improve their food resources, and improve the methods of utilizing those resources? This step carries us from the present study into a whole new field. On our success in exploring this new field, the effectiveness of our solution of the food problem rests. We must carry our information back to our village and translate it into village terms, with the help of educated Indian friends who can interpret for us. They know the world of spirits in which villagers dwell, better than we do.

An illustration of this is one of the many stories told about a gallant Indian woman lawyer who goes into remote sections of the country in connexion with her official duties. Once while visiting a home where her women clients were particularly superstitious, she found them in terror of the threatened visit of the smallpox goddess. The goddess had already brought tragedy to several of their neighbours. They were using all of the charms within their reach to persuade her to pass their house by. The educated Indian woman knew the futility of urging vaccination in this home. She asked the women if the smallpox goddess did not like a sacrifice of blood. They agreed that she did. Then said the educated woman, “I know a spirit charmer who wards off the smallpox goddess by blood sacrifice. Each of you may share in the offering.” They had already employed the services of local spirit charmers, and were ready to try another. The educated woman drove to the nearest town and brought the district vaccinator back with her. He was allowed to scratch the arm of every one in the family. They were warned that in a few days the goddess would come, but learning of their blood sacrifice, she would pass on without the usual terrible visit. Women like this, rather than scientists, can help us in the study of present attitudes, and in the task of interpreting in terms of those attitudes. Education is slowly reaching the villages. But until it is much better than at present, we do not want our people to cast everything of the past aside. In so doing they would lose much of value which experience has taught them.

I should like to close this study, with a suggestion of the future of nutrition in India. In 1928, the following statement was made by the Royal Commission on Agriculture :

“The problems of human nutrition, which have only recently come into prominence are being investigated by Colonel McCarrison who is working under the Research Fund Association at Coonoor. He lays emphasis on malnutrition as a problem facing those engaged in agricultural research. In his inquiries, Colonel McCarrison invokes the aid of the agricultural departments. The problems of human and animal nutrition are likely to assume such importance that we consider it desirable that work on human nutrition and on the nutrition of farm animals should be carried out in the closest co-operation, or, in other words, that there should be team work by workers with a knowledge of different branches of the science of nutrition. Continuity is also essential. The various workers on nutrition problems should be formed into a committee on nutrition which would meet at regular intervals to discuss common questions. This would assure the requisite close touch between different branches of the subject. In view of the importance of the subject, we recommend that a central institute of human nutrition should be established.” (57).

Since this report, the important work carried on at Coonoor has continued, under the direction of Sir Robert McCarrison, until his recent retirement. His successor, Dr. W. R. Aykroyd, has a record of thorough scientific research. To this he is rapidly adding an interest in ways of meeting the nutritional needs of poorer families in India. He has already worked out an adequate diet which is low in cost, and available in villages. Meanwhile, further research is being conducted, and applied practically in the All-India Institute of Hygiene and Public Health, Calcutta. There are other centres of useful research, in Calcutta, Bangalore, Bombay, and Allahabad. Indian food-stuffs are being analysed, so that we shall no longer depend upon Western tables. Ordinary diets are being tested, both in laboratories and in boarding institutions.

The most recent move has been the correlation of these scattered studies. During the last Indian Science Congress, in Indore, in February, 1936, an Indian Nutrition Committee was formed. And still more recently, our new Viceroy revived the above quoted suggestions of the Royal Commission of which he was chairman, at the opening meeting of the new Nutrition Advisory Committee of the Indian Research Fund Association. We look upon this committee as the beginning of active, unified interest in human nutrition in India.

Meanwhile, public interest in this subject has been growing popular lectures on diet problems now have their place in gathering to promote public welfare. Leaflets are being prepared like that issued by the Bombay Presidency Baby and Health Week Association on

Balanced Diets. Newspapers and magazines now publish more articles on nutrition within a month than they did in a year when the Royal Commission first proposed an institute of human nutrition.

All of this is bound to influence the literate townsman. But much more must be done, to reach the illiterate villager and his wife. Perhaps establishing literacy is the first step. To quote from the Viceroy's speech at the opening of the Nutrition Advisory Committee: "I am entirely convinced that, whether we are concerned to advance among the rural population improved agricultural practice or better sanitation and hygiene or better nutrition, we shall find that our best endeavours will achieve little that will endure unless and until literacy is imparted to the women of the countryside. We may bring about some considerable degree of improvement under existing conditions by means of intensive propaganda and close supervision, but in default of female literacy it will be found that whenever supervision is removed there will be a relapse into age-old customs and that, within a few months, nothing will be left of the better living that has been so laboriously inculcated." While literacy is being made possible, we must find ways of presenting better nutrition in terms of a villager's experience. He is suspicious of anything new or strange. If we press upon him, ideas which have not been carefully tested, or ideas which involve drastic change, we shall strengthen his prejudice against what he regards as interference. But he and his wife will gladly accept one simple suggestion at a time, if they understand its benefit and see that this benefit can be attained without additional cost. They are too poor to risk even a pice in experimenting. And while their simple, very practical learning is going on, we can educate their children toward an understanding and appreciation of the purposes and results of Science.

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